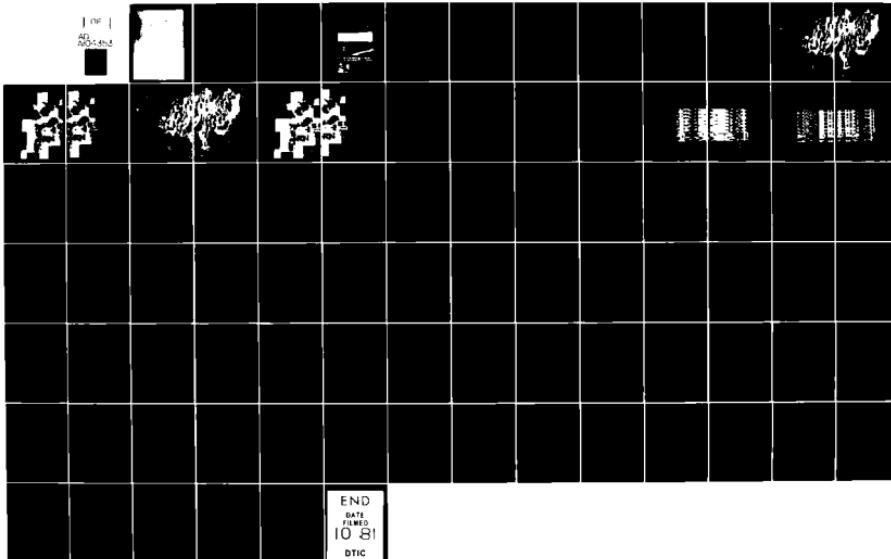


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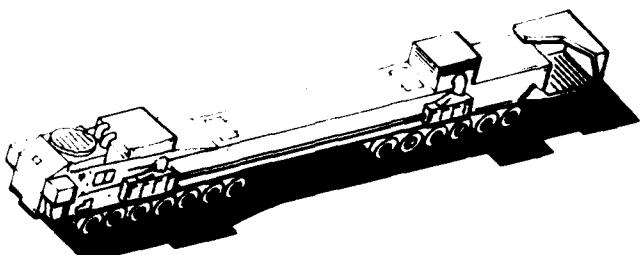
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locations and identify the mitigations that are available. This EIS draft will be the basis for further public comment on the proposed project. A final EIS will be prepared in careful consideration of those comments and serve as an input to the decision process on a location for M-X deployment and withdrawal/acquisition of the land to base the system. The Bureau of Land Management, Department of the Interior, is a cooperating agency for this EIS.

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SUMMARY

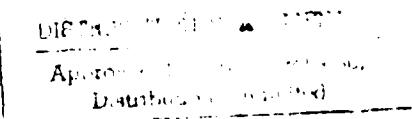


Environmental Impact Analysis Process



DEPLOYMENT AREA SELECTION
AND LAND WITHDRAWAL/
ACQUISITION DEIS

DEPARTMENT OF THE AIR FORCE



**DEPLOYMENT AREA SELECTION
AND
LAND WITHDRAWAL/ACQUISITION DEIS**

CHAPTER 1: PROGRAM OVERVIEW

CHAPTER 1 PRESENTS AN OVERVIEW OF THE M-X SYSTEM AND THIS EIS INCLUDING:

- o A DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES, INCLUDING SCHEDULE AND RESOURCE REQUIREMENTS
- o AN OVERVIEW OF THE TIERED M-X ENVIRONMENTAL PROGRAM THAT INVOLVES SITE SELECTION AND LAND WITHDRAWAL
- o A PRESENTATION OF PUBLIC SAFETY CONSIDERATIONS WITH PHYSICAL SECURITY AND SYSTEM HAZARDS
- o A SUMMARY OF FEDERAL AND STATE AUTHORIZING ACTIONS ASSOCIATED WITH CONSTRUCTION AND OPERATIONS

CHAPTER 2: COMPARATIVE ANALYSIS OF ALTERNATIVES

CHAPTER 2 COMPARES THE ENVIRONMENTAL IMPACTS OF ALTERNATIVE M-X SYSTEM AND OPERATING BASE COMBINATIONS. DETAILS INCLUDE:

- o THE SELECTION OF LOCATIONS FOR TWO SUITABLE DEPLOYMENT REGIONS, 200 CLUSTERS, AND SEVEN ALTERNATIVE OPERATING BASES
- o PRESENTATION OF CONCEPTUAL CONSTRUCTION SCHEDULES, PERSONNEL REQUIREMENTS, AND RESOURCE NEEDS FOR EACH ALTERNATIVE
- o COMPARATIVE ENVIRONMENTAL ANALYSIS BY ALTERNATIVE FOR EACH RESOURCE PRESENTED IN CHAPTERS 3 AND 4

CHAPTER 3: Affected Environment

CHAPTER 3 DESCRIBES THE POTENTIALLY AFFECTED ENVIRONMENT IN NEVADA, UTAH, TEXAS, AND NEW MEXICO. ENVIRONMENTAL FEATURES OF BOTH BI-STATE REGIONS AND OF OPERATING BASE VICINITIES ARE PRESENTED. RESOURCES ADDRESSED INCLUDE:

- o WATER, AIR, MINING, VEGETATION, AND SOILS
- o WILDLIFE, AQUATIC SPECIES, AND PROTECTED PLANT AND ANIMAL SPECIES
- o EMPLOYMENT, POPULATION, PUBLIC FINANCE, TRANSPORTATION, CONSTRUCTION RESOURCES, ENERGY, LAND USE, AND RECREATION
- o CULTURAL RESOURCES, NATIVE AMERICAN CONCERNs, ARCHAEOLOGICAL AND HISTORIC FEATURES

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES TO THE STUDY REGIONS AND OPERATING BASE VICINITIES

CHAPTER 4 EXPANDS THE CHAPTER 2 ANALYSIS FOR EACH RESOURCE IN CHAPTER 3. ADDRESSING THE QUESTIONS RAISED IN SCOPING, CHAPTER 4 DISCUSSES THE FOLLOWING TOPICS ON A RESOURCE BY RESOURCE BASIS.

- o THE REASON EACH RESOURCE IS IMPORTANT AND THE SOURCE OF SIGNIFICANT DIRECT AND INDIRECT IMPACTS
- o THE INTERRELATIONSHIPS BETWEEN RESOURCES AND KEY CAUSES OF SHORT- AND LONG-TERM IMPACTS SUCH AS AREA DISTURBED AND POPULATION GROWTH
- o MITIGATIVE MEASURES WHICH POTENTIALLY REDUCE IMPACTS
- o A MATRIX OF POTENTIAL IMPACT SEVERITY BY GEOGRAPHIC AREA FOR THE PROPOSED ACTION AND EACH ALTERNATIVE

CHAPTER 5: APPENDICES

CHAPTER 5 CONTAINS AN M-X BASING ANALYSIS REPORT WITH APPLICATION OF SELECTION CRITERIA TO CANDIDATE BASING AREAS. ADDITIONAL SECTIONS INCLUDE:

GLOSSARY
ACRONYMS
LIST OF PREPAREDERS
DISTRIBUTION LIST

BIBLIOGRAPHIC NOTE
REFERENCES
INDEX

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**M-X DEPLOYMENT AREA SELECTION AND LAND
WITHDRAWAL/ACQUISITION ENVIRONMENTAL IMPACT STATEMENT
SUMMARY**

Overview

The United States Air Force proposes to deploy an advanced, land-based mobile, intercontinental ballistic missile (ICBM) system known as M-X. This system will improve the nation's strategic deterrent force. In this regard, the Air Force is dedicated to meeting national defense goals while conserving natural and human resources. The purpose of this Environmental Impact Statement (EIS) is to document the analyses and studies performed to identify and compare potential impacts of proposed and alternative basing locations and identify the mitigations that are available. This EIS draft will be the basis for further public comment on the proposed project. A final EIS will be prepared in careful consideration of those comments and serve as an input to the decision process on a location for M-X deployment and withdrawal/acquisition of the land to base the system. The Bureau of Land Management, Department of the Interior, is a cooperating agency for this EIS.

This EIS is the third in a series of four planned environmental impact statements for M-X. The first was an analysis of the buried trench construction test program (M-X: Buried Trench Construction and Test Program Final EIS). The second addressed full-scale engineering development decisions regarding missile design, basing mode selection, and a flight test program at Vandenberg Air Force Base, California (M-X: Milestone II Final EIS). That EIS was the basis for decisions on the basing mode. It analyzed vertical and horizontal shelters, slope-sided pool, 20-mile trench, and air mobile. On September 7, 1979 the President announced his decision to proceed with full-scale engineering development of M-X in a horizontal multiple protective shelter (MPS) basing mode. This decision was confirmed by Congress in the Cannon amendment to the DoD Authorization Act for Fiscal Year 1981. This third EIS provides environmental information for a decision on basing area selection and land withdrawal/acquisition for M-X deployment under the MPS concept. It does not readdress basing mode selection. A fourth EIS will analyze the environmental consequences of production, a decision planned for mid-1983.

M-X deployment is still in the early stages of planning. As the program develops, changes will need to be made in the system. Knowledge also will advance concerning the implications of the program for the natural environment and the social and economic fabric of the deployment area. The analysis of impacts in the EIS, therefore, is necessarily the product of best knowledge at a point in time. The urgency of the M-X program to the defense of the United States in view of the serious growing vulnerability of the Minuteman and Titan missiles to advances in Soviet weaponry requires that decisions be made as soon as possible on the best available evidence.

Purpose and Need

In the early 1970s, the Air Force recommended development of a new land-based ICBM system to meet the challenge of then on-going Soviet efforts to develop new ICBM systems. By 1978, the need for a new U.S. ICBM system was definitely established when the Soviets demonstrated in tests significant improvements in their

ICBMs. Key among these improvements are the Soviet fourth-generation ICBMs. These fourth-generation missiles are being deployed in very large numbers, and with reentry vehicles with sufficient accuracy such that any fixed target is placed at risk. The United States has deployed three generations of Minuteman missiles. By the early 1980s, Minuteman and Titan missiles will be vulnerable to a first strike attack, which could destroy all but a small percentage of the silo-based missiles. The M-X has been designed to redress this survivability problem and allow the United States to maintain a viable, survivable ICBM force.

All three legs--land, air, and sea forces--of the U.S. strategic TRIAD possess unique characteristics that complicate Soviet offensive and defensive planning. They complement one another, and together have provided a valuable hedge against two risks: 1) technical problems in a U.S. system which can temporarily disable one leg, and 2) breakthroughs or rapid evolution of threats which may erode survivability of one leg. In either situation, if the two remaining legs are not strong, the capability to preserve deterrence is weakened. If M-X is not deployed, the United States will effectively sacrifice the ICBM leg of the TRIAD. Abandoning the ICBM would concede an important perceptual advantage to the Soviets, as well as a military advantage by easing the problems they face in dealing with the air and sea forces that form the remaining two legs of the TRIAD. Strategic stability would be reduced in that the Soviets might perceive not only an advantage in striking first, but also an increased likelihood that the United States would strike first in a crisis because of Minuteman vulnerability. Consequently, the Department of Defense and the Air Force have concluded that failure to deploy the M-X system would result in an eventual unacceptable risk to the survivability of the land-based missile segment of the nation's strategic force.

System Characteristics

The M-X system would use 200 mobile missiles in 4,600 shelters. This concept, known as a multiple protective shelter system evolved after 20 years of study and consideration of more than 35 basing modes. On September 7, 1979, President Carter announced his decision to proceed with full-scale engineering development of the missile and basing mode concept. There are three main components to the M-X system: (1) the missile, (2) the facilities and equipment in the designated deployment area (DDA), and (3) the operating bases (OB). The missile is designed so that it can be moved while horizontal and erected to a vertical position for firing. After the missile is assembled at a centralized facility, it is transported by a large vehicle and hidden in one of 23 underground garage-like protective structures. Survivability is achieved by concealment, mobility, shelter hardness, and spacing.

Each missile can be concealed in any of 23 horizontal protective shelters; consequently, each shelter must be attacked successfully to assure destruction of the missile. A Soviet missile with ten reentry vehicles could destroy, at best, only ten of the 23 shelters in a cluster. With 200 M-X deployed, this 2.3 to 1 exchange ratio would leave the Soviets in a less favorable position with respect to the United States after they had launched an attack than they were previously. Such a situation is designed to deter them from attacking at all, and thus achieve the fundamental purpose of the M-X system: to maintain the peace.

All the facilities for housing and maintaining missiles will normally be unmanned, as is done with the existing Minuteman system. Once emplaced, the

missiles will be moved infrequently. Maintenance and security personnel would travel from a few small support centers located throughout the deployment area. The majority of the people required to operate and support the system will be located at two operating bases, each a community of 13,000 to 17,000 workers and dependents.

Application of military, operational, geotechnical, and environmental criteria at successive levels of detail resulted in suitable deployment regions in Nevada, Utah, Texas, and New Mexico. Within these regions, the Air Force has selected three deployment areas or combinations of areas for environmental analysis.

Description of Proposed Action and Alternatives

Table 1 lists the Proposed Action and alternatives. For convenience, alternatives have been assigned reference numbers but these are not intended to convey any ranking of alternative. The EIS also considers the no-action alternative.

Information collected to date, particularly in regard to military and operational factors, indicates that Nevada/Utah is the preferred region for M-X deployment. The Proposed Action is to deploy the system in Nevada and Utah, with operating bases in Coyote Spring Valley north of Las Vegas, Nevada, and near Milford, Utah (see Figure 1). Alternatives 1 through 6 deploy 200 missiles in the same area of Nevada/Utah as for the Proposed Action with two OBs selected from the vicinities of several possible locations: Coyote Spring Valley or Ely, Nevada; and Milford, Beryl or Delta, Utah.

Alternative 7 (see Figure 2) is deployment of 200 missiles in Texas/New Mexico, with OBs near Dalhart, Texas, and Clovis, New Mexico. Alternative 8 locates 100 missiles in Nevada/Utah, with an OB in Coyote Spring Valley, and 100 in Texas/New Mexico, with an OB near Clovis (see Figure 3 and 4).

The system is expected to be dispersed over approximately 8,500 sq mi; however, only about 25 sq nautical mi of this area will be fenced and excluded from public access. Approximately 8,500 mi of new roads are planned, 1,400 mi of which will be paved. All of these roads will be open to public use. These roads will require up to 80,000 acres of land for rights-of-way. In all, 160,000 acres of land may be disturbed during construction.

Suitable Zones for Facility Siting

Separate sets of criteria were applied to define Suitability Zones for the designated deployment areas and operating base locations. The objective was to select zones in which the M-X system could be deployed to meet operational requirements, could coexist with local activities, and would cause least disturbance to human and natural (biophysical) environments. For example, the areas in which the missiles will be deployed will avoid cultural and economic resources such as natural parks and forests; oil, gas, and mineral fields; population centers; and environmentally sensitive areas. The Suitability Zones also must meet certain "geotechnical" requirements with respect to land slope and roughness, depth to bedrock and groundwater, etc. The operating bases must be adjacent to the missile deployment area and meet still other criteria, such as access to transportation (airfields, railways, and highways).

Construction Schedule and Resources

Construction is scheduled to start in early 1982 and continue for approximately 8 years. The first ten missiles are to be operational by July 1986. Approximately 19,000 construction workers and 6,000 assembly and checkout personnel will be employed on the project in the peak year. Major resources required over this 8-year period include a total of 80,000 to 130,000 acre-feet of water distributed over the deployment region, about 400,000 tons of steel and about 1.5 million tons of cement.

Table 1 Proposed Action and Alternatives.

PROPOSED ACTION AND ALTERNATIVES	DEPLOYMENT AREAS'				OPERATING BASE VICINITIES	
	NEVADA	UTAH	TEXAS	NEW MEXICO	FIRST	SECOND
Proposed Action						
Nevada Utah, Full Deployment	— 200 —	0	0		Coyote Spring Valley, NV	Milford, UT
Full Deployment Alternatives						
1. Nevada Utah	— 200 —	0	0		Coyote Spring Valley, NV	Beryl, UT
2. Nevada Utah	— 200 —	0	0		Coyote Spring Valley, NV	Delta, UT
3. Nevada/Utah	— 200 —	0	0		Beryl, UT	Ely, NV
4. Nevada Utah	— 200 —	0	0		Beryl, UT	Coyote Spring Valley, NV
5. Nevada Utah	— 200 —	0	0		Milford, UT	Ely, NV
6. Nevada Utah	— 200 —	0	0		Milford, UT	Coyote Spring Valley, NV
7. Texas New Mexico	0	0	— 200 —		Clovis, NM	Dalhart, TX
Split Basing Alternative						
8. Nevada Utah-Texas-New Mexico	— 100 —	— 100 —			Coyote Spring Valley, NV	Clovis, NM
No Action Alternative	NA			NA	NA	NA

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The numbers represent missiles deployed (approximate for split basing).

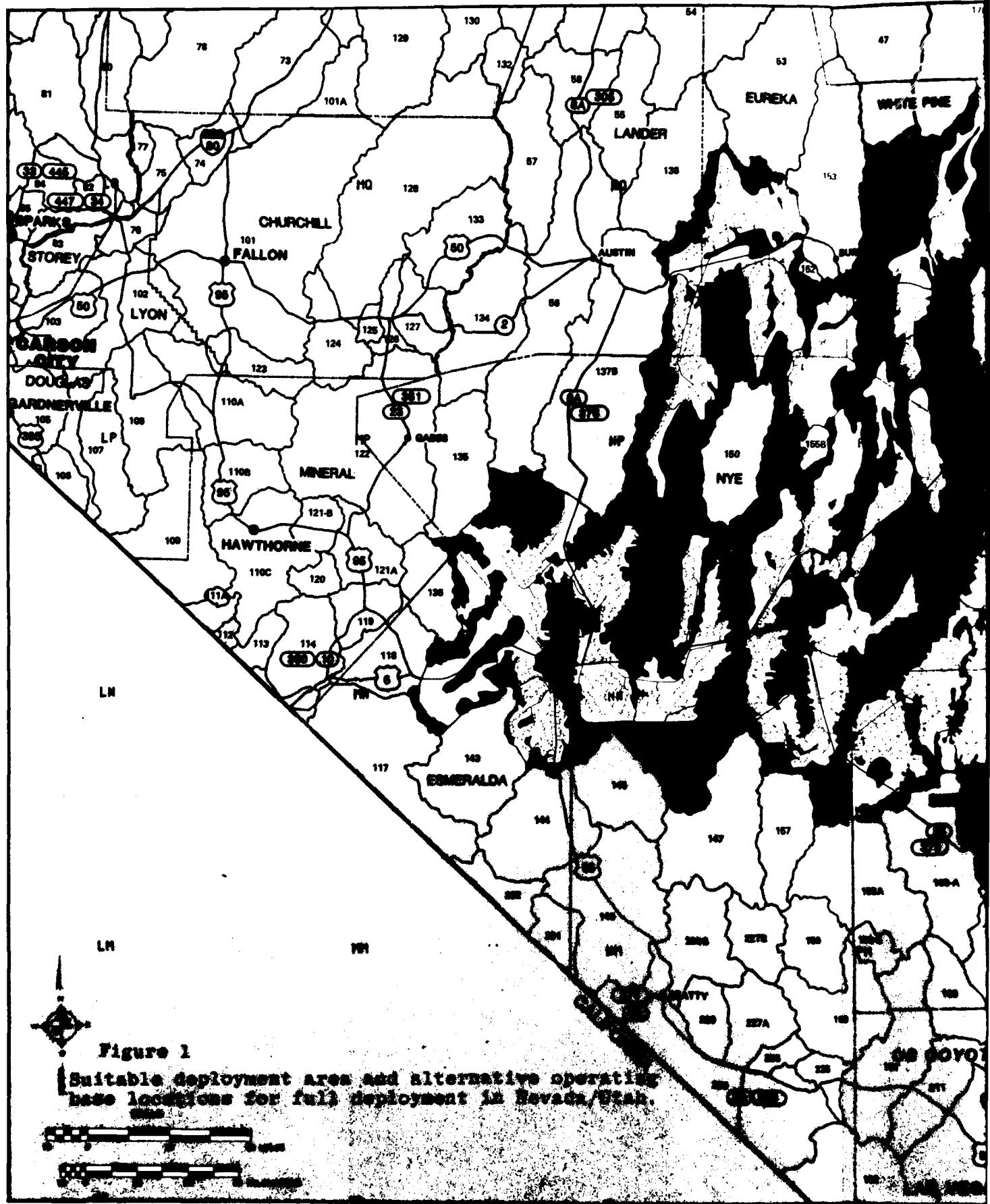
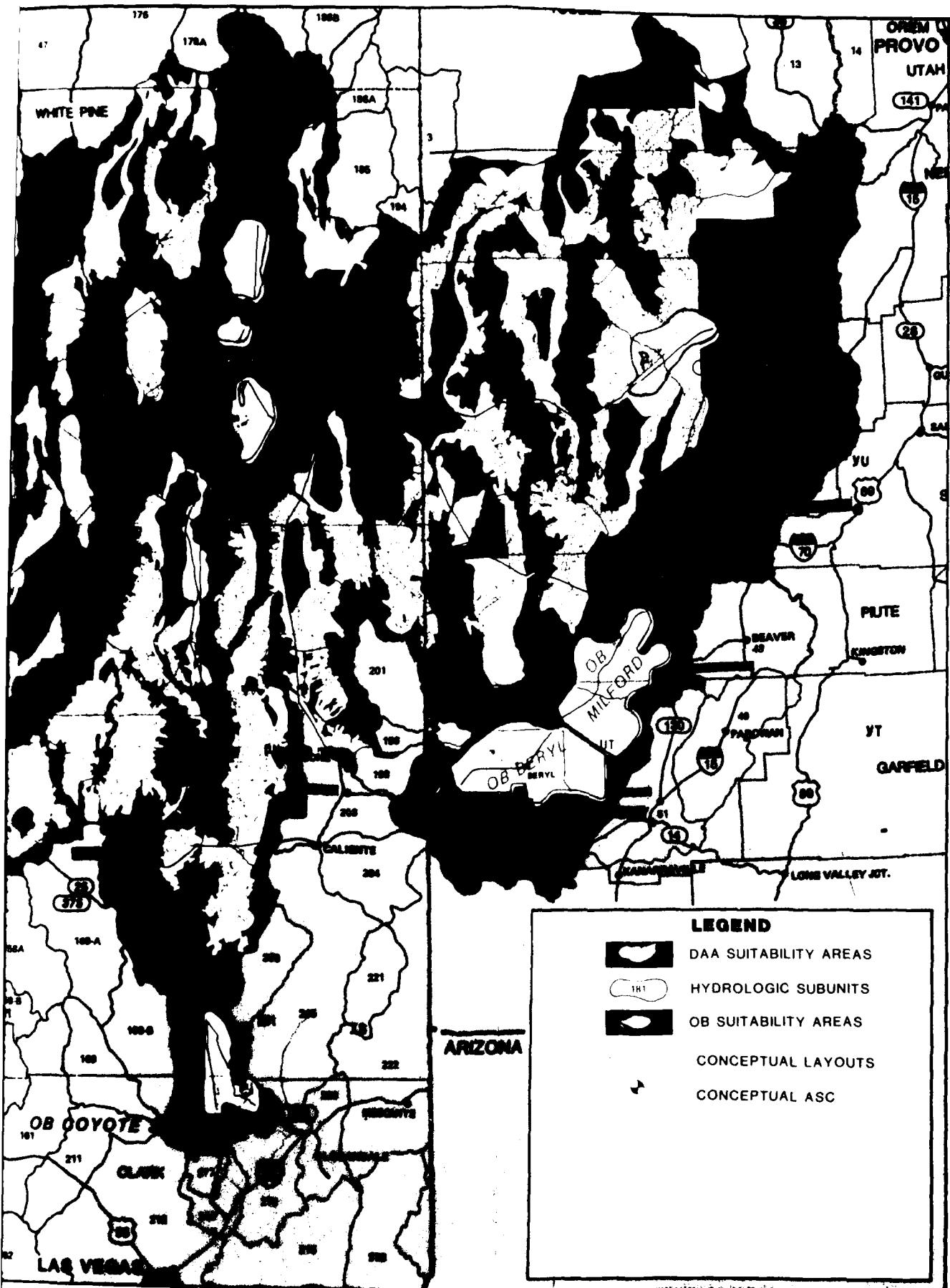


Figure 1
Suitable deployment area and alternative operating base locations for full deployment in Nevada/Utah.



LEGEND

DAA SUITABILITY AREAS



HYDROLOGIC SUBUNITS

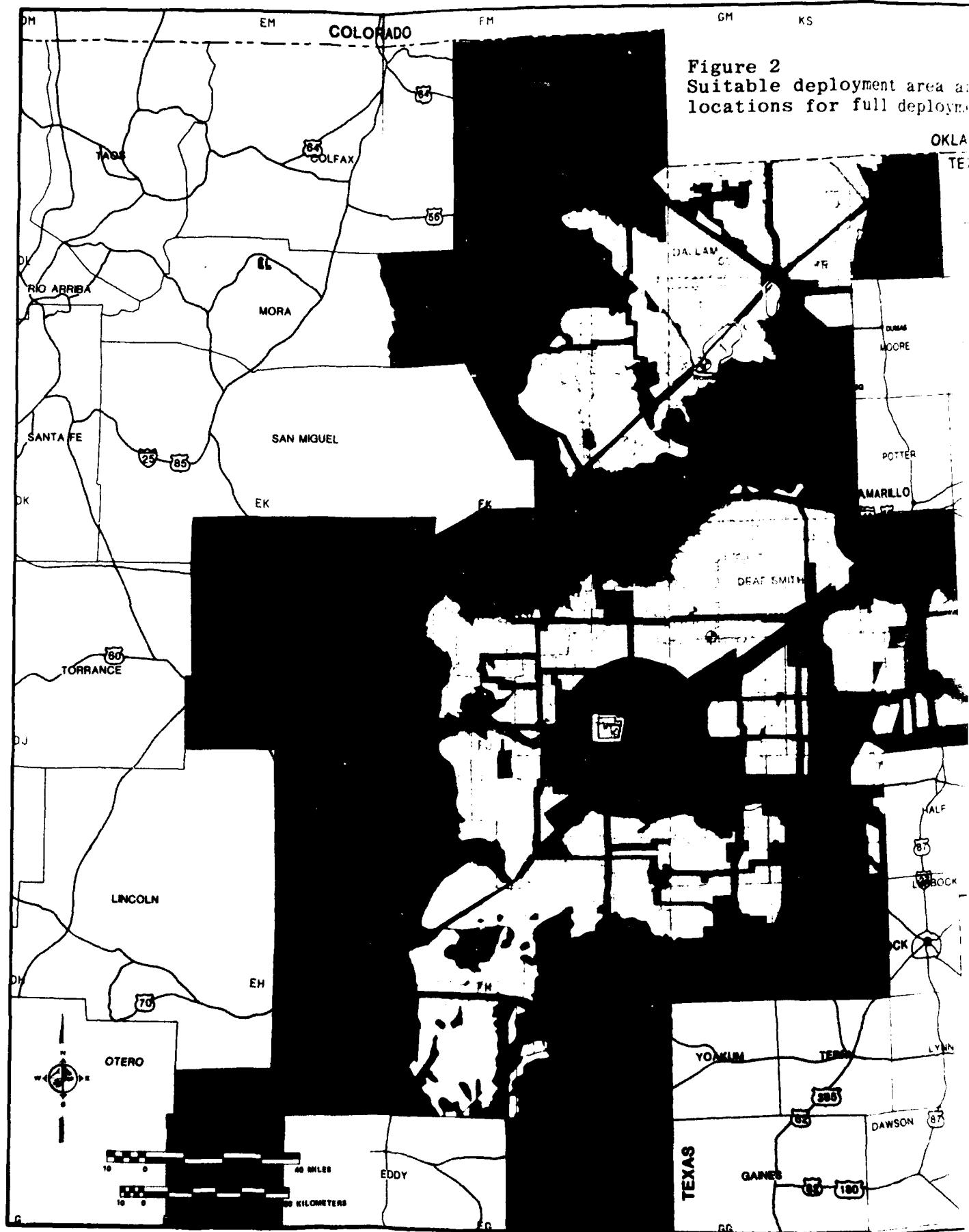


OB SUITABILITY AREAS

CONCEPTUAL LAYOUTS



CONCEPTUAL ASC



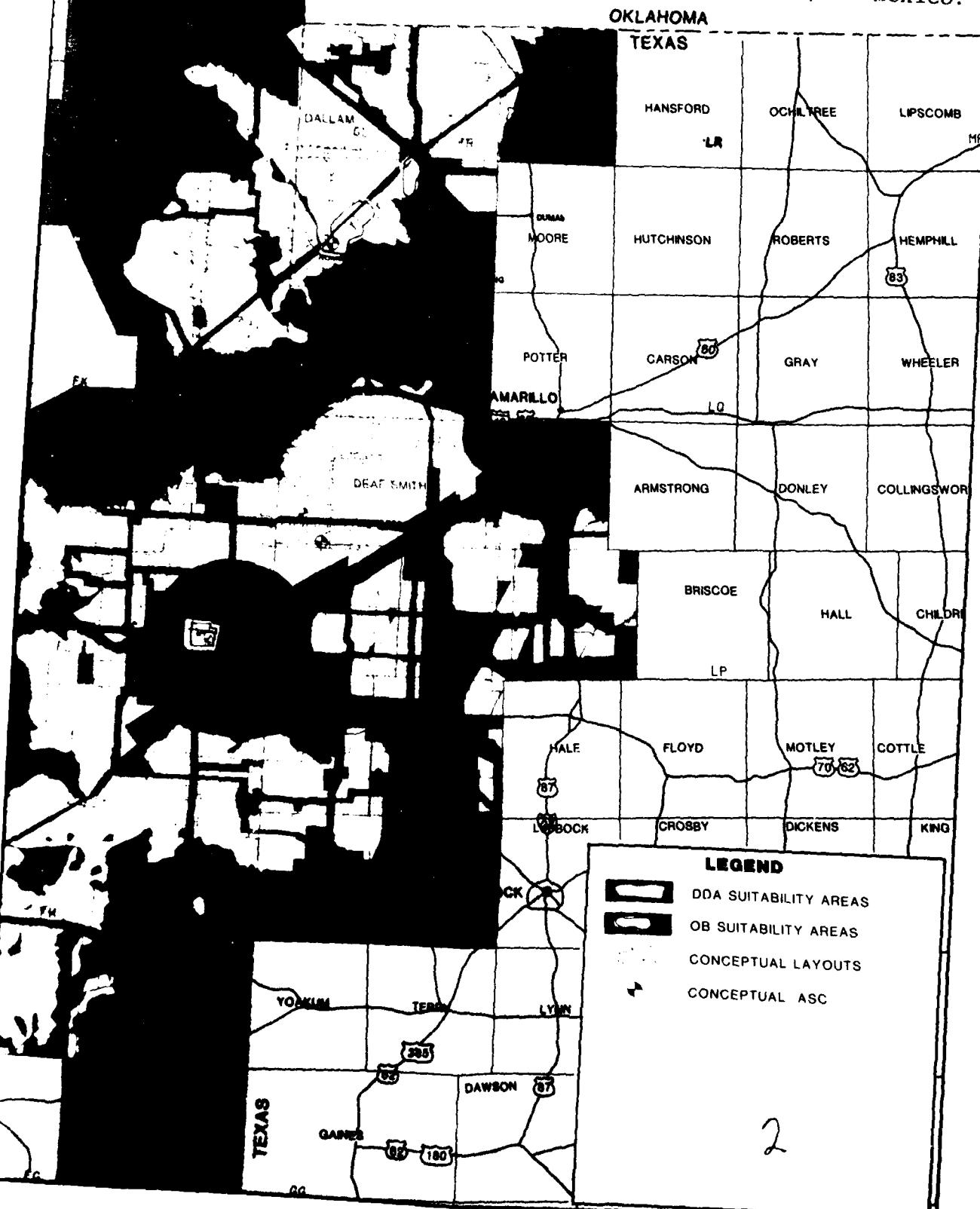
FM

GM

KS

LS

Figure 2
Suitable deployment area and operating base
locations for full deployment in Texas/New Mexico.



LEGEND

■ DDA SUITABILITY AREAS

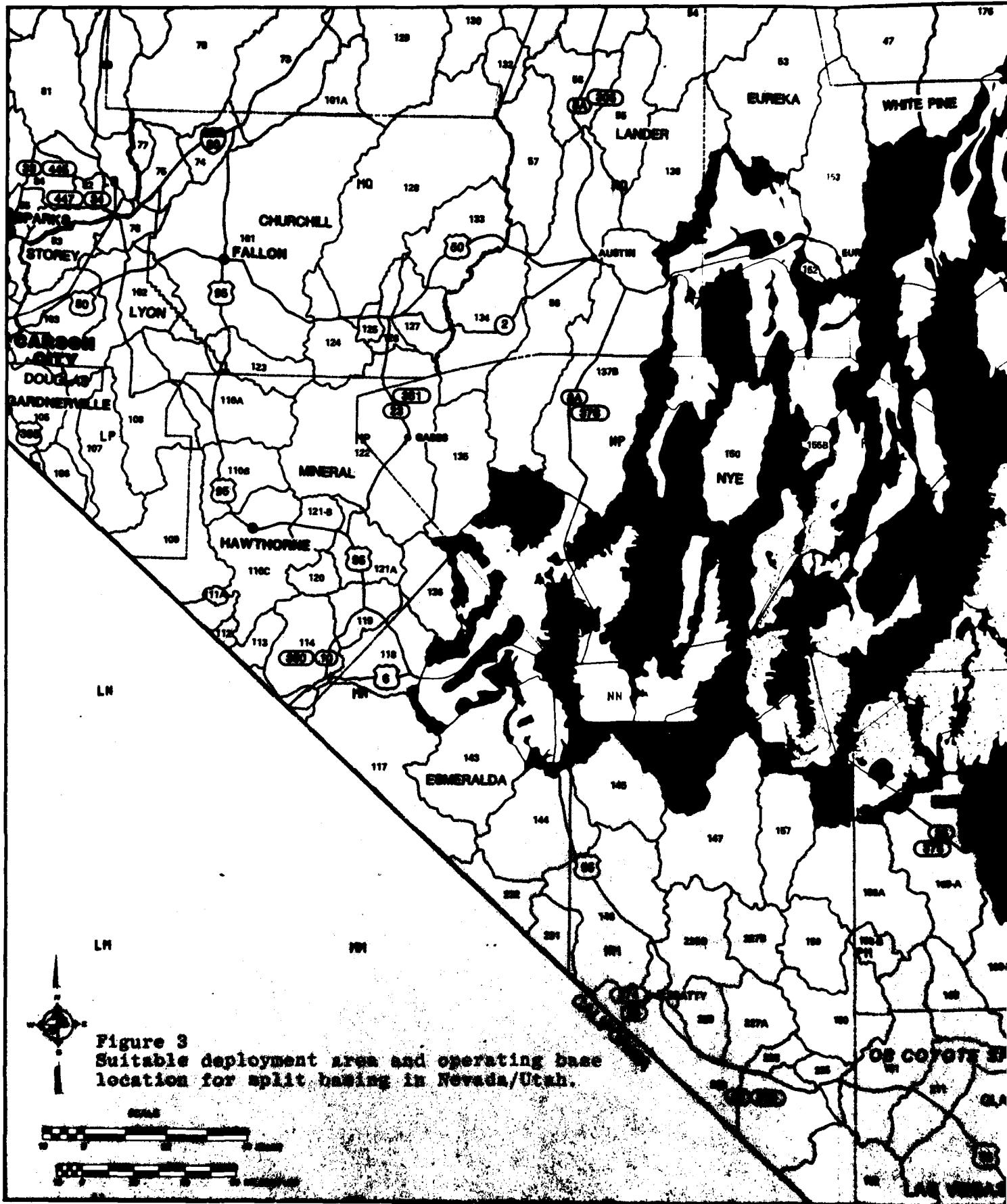
■ OB SUITABILITY AREAS

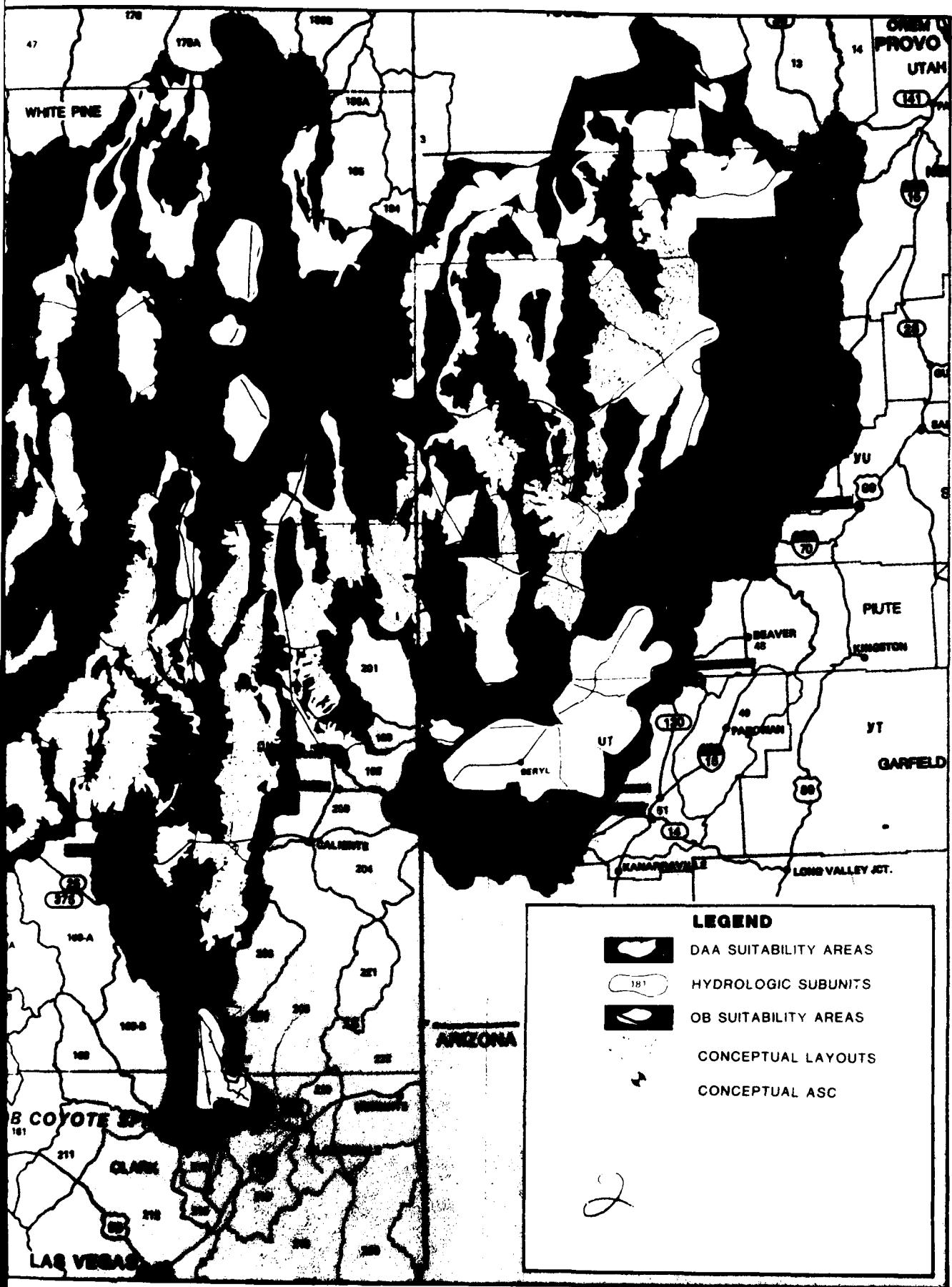
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CONCEPTUAL ASC

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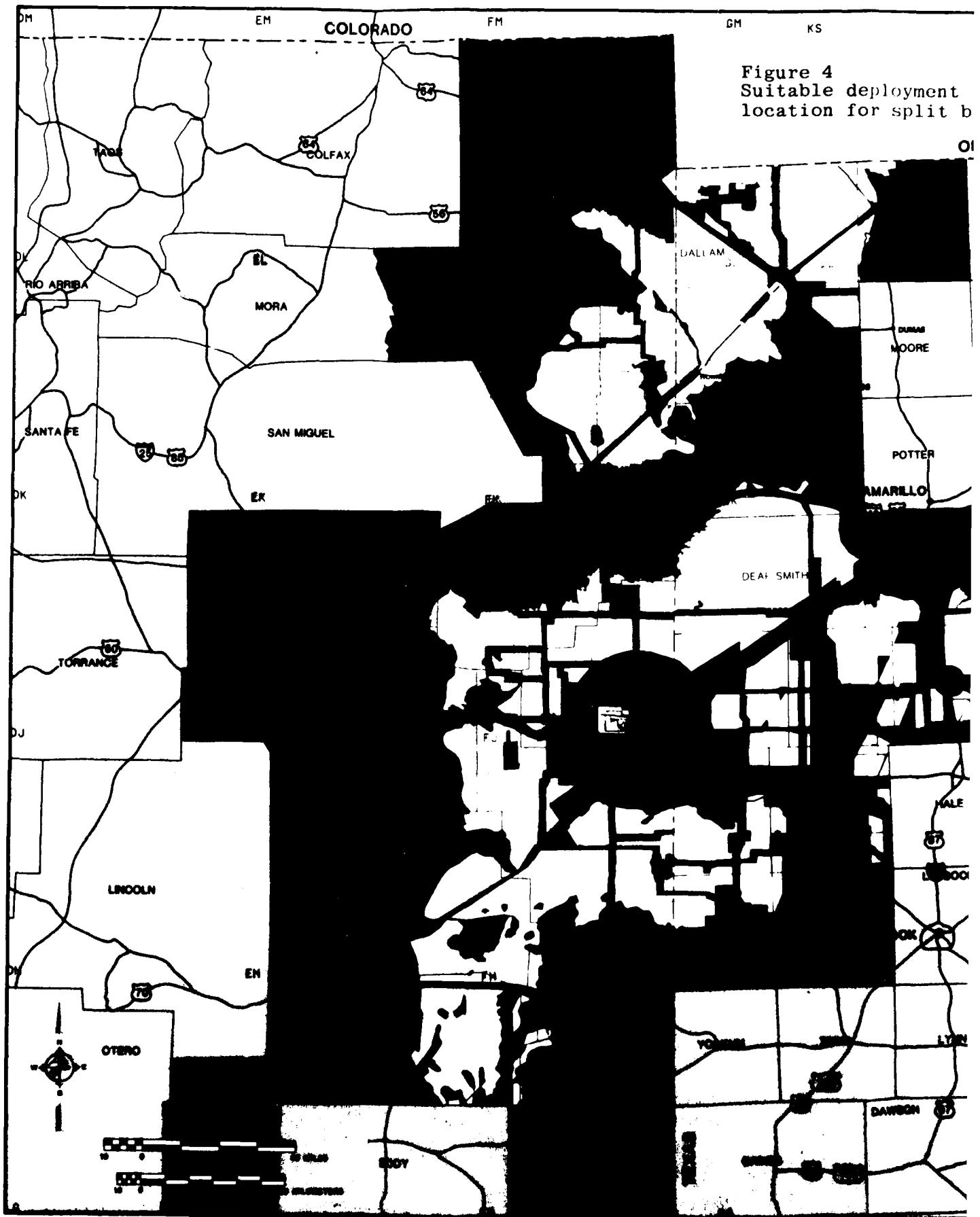


Figure 4
Suitable deployment location for split b

GM

KS

LS

Figure 4
Suitable deployment area and operating base
location for split basing in Texas/New Mexico.

OKLAHOMA

TEXAS

HANSFORD

OCHILTREE

LIPSCOMB

LR

MP

MOORE

ROBERTS

HEMPHILL

POTTER

CARBON

GRAY

WHEELER

AMARILLO

DEAN SMITH

ARMSTRONG

DONLEY

COLLINGSWOR

BRAESOCE

HALL

CHILDRE

LP

HALE

FLOYD

MOTLEY

COTTLE

BROWN

CLOUDY

DICKENS

KING

LEGEND

DDA SUITABILITY AREAS

OB SUITABILITY AREAS

CONCEPTUAL LAYOUTS

CONCEPTUAL ASC

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Land Withdrawal/Acquisition

Land must be available in time to support initial construction in 1982 and subsequent construction increments. If the system is sited in Nevada/Utah, it would be predominantly on public land which would be obtained through withdrawal and acquisition of right-of-way and use-permits. In Texas and New Mexico, the majority of the required land is privately owned. All land acquisition will require an act of Congress and Presidential approval.

Executive Order 12049, Defense Economic Adjustment Programs, provides that the Secretary of Defense establish a program to assist in the alleviation of serious economic and social impacts which result from major defense activities. The President's Economic Adjustment Committee (EAC), made up of representatives of all cabinet, department and several other executive agencies, has considered M-X impacts and has established a special assistance task force which meets regularly. All executive agencies are required to support the Secretary of Defense's economic adjustment activities by providing personnel, technical expertise, legal authorities and available financial resources so that a coordinated federal response can be made to the needs of individual communities, states and regions. Further, EAC's comprehensive plan for M-X will provide for priority assistance to communities.

OEA's special M-X staff and Air Force representatives have briefed the staffs of several major executive agencies in Washington, D.C., and the Federal Regional Councils (FRC). Federal agencies have been asked to anticipate M-X related funding requirements and to plan for simplified methods of delivering federal assistance.

Because Department of Defense and Air Force experience has shown that a successful economic adjustment strategy depends upon strong, effective local leadership working in partnership with state and federal agencies, OEA and the Air Force have encouraged the establishment of local intergovernmental working groups. Further, private-sector participation has been sought.

To assist in financing economic planning the Air Force has requested and Congress has provided funds for fiscal years (FY) 1980 and 1981. The Air Force continues to support the principle that the federal government has a responsibility to provide planning assistance to states, counties and other local government agencies.

In short, the federal government has accepted this responsibility to mitigate the adverse economic impacts of M-X on communities, states and regions and will provide priority technical assistance, financial resources or other requirements.

Tiered Decision Making

The EIS provides environmental information to aid in making two major decisions: selection of the DDA and of the OB suitability zones. It does not, however, contain all of the information which will become available over the next few years for selection of each specific facility site. This process of step-by-step analysis and decision-making is called "tiering" and is authorized by the Council on Environmental Quality regulations implementing and National Environmental Policy Act. Tiering is appropriate when the sequence of analysis proceeds from an EIS at

an early decision stage, such as this DDA selection and OB vicinity-selection, to a later stage of selecting specific facility construction sites. Decisions regarding the siting of each individual facility and the OB boundary, as well as site-specific location of construction camps and their attendant life support facilities, will follow further, more site-specific analysis in subsequent tiers. The decision maker will use this EIS (Tier 1) and other information to select a missile deployment regional suitability zone or zones in one or two regions and will select suitability zones for the two OBs.

The system may expand or contract from the conceptual layout, but will remain within the zone identified in this EIS. In the event that it become necessary to move outside this suitability zone, a supplemental EIS will be required. To be certain that the consequences of the specific sitings in subsequent tiers are known before the final site is selected, engineering and environmental field studies for the specific site will be conducted. These continuing studies will provide information for subsequent selection of specific sites in Tier 2, 3, 4, etc.

Tier 2 includes the development of an operating base comprehensive plan (BCP), which is a physical development plan in narrative and graphic form. It illustrates operational, economic, social, environmental and legal aspects of all current and projected land use for the OB and its off-base sites. The development of the BCP in Tier 2 includes input from, and coordination with, state and local planning agencies and the Department of Defense's Office of Economic Adjustment (OEA).

The BCP development process will select a specific site for the OB and its off-base sites within the suitability zone designated in this EIS (Tier 1). The BCP will initially show the boundary of the base and include boundaries of specific sitings required for the initial operating capability as well as some immediate follow-on facilities. The BCP at the Tier 2 stage will also identify the entire base development pattern and the major road network, including runway orientation, industrial area, community center, recreation areas, housing, etc., as well as the total DDA layout. The Tier 2 decision will also include specific site selections for the off-base operational base test site (OBTS) and the special road (designated transportation network, or DTN) that connects the first base, the OBTS and the DDA. Construction marshalling yards and life support facility sitings will also be identified.

Site-specific environmental field studies will be conducted to verify the consequences of these facility sitings, and a report assessing these findings will be prepared. The site selections will be accomplished by an interdisciplinary facility siting team of operational and environmental planners from the Air Force, the Corps of Engineers, and the Bureau of Land Management, including contractual assistance, who will work in coordination with state and local planning agencies.

In developing proposal for specific site selections in Tier 2, the facility siting team will consider the environmental consequences predicted in this EIS (Tier 1). The specific site selection process of Tier 2 will carefully consider environmental and suitability factors found in the field studies, and the site selection team may have the opportunity to avoid adverse environmental consequences predicted in this EIS (Tier 1). A report predicting the environmental consequences of sitings proposed by the facility siting team will be documented in a site-specific Environmental

Assessment (EA) for use in Tier 2 site-specific decisions. The findings in the EA for the Tier 2 decision will be compared with the impacts predicted in this EIS (Tier 1). If the impacts are found to be less adverse, or substantially the same for sitings within that hydrological unit or county as appropriate the Air Force will prepare a Finding of No Significant New Impact (FONSNI), officially documenting this comparison.

This FONSNI would be provided to the Bureau of Land Management (BLM) or the U.S. Army Corps of Engineers to proceed with public land withdrawal or private land acquisition processes in accordance with applicable legislative authority. Public hearings would be held on the withdrawal of land for the Tier 2 sites, as well as an invitation for the public to comment on the FONSNI. The FONSNI for acquisition of land would be available to the public for comment on request. Following public comment and in consideration of those comments received, a decision will be made to proceed with the public land withdrawal or private land acquisition in accordance with enabling legislative procedures or to amend the site selection of the Tier 2 proposals.

Should the comparison of the Tier 2 environmental assessment and the area-wide EIS (Tier 1) reveal that the predicted adverse impacts are substantially worse than those predicted in the EIS, then a draft supplemental EIS will be prepared. Follow-on site-specific decisions would be grouped in subsequent tiers and similarly processed.

Environmental Issues

During December 1979 and January 1980, November 1980 and December 1980, the Air Force conducted a number of federal agency, state agency, and public meetings to hear agency and public concerns regarding the project that should be addressed in the EIS. Among the issues of official and public concern were:

- o Adverse impact on communities and individuals caused by rapid, large scale growth
- o Incompatibilities with current or planned public and private land use
- o Competition for limited water resources
- o Risks to public health and safety, reduction of natural resources, and energy competition

These issues were analyzed, expanded, and grouped into categories for examination by scientists, engineers, architects, land use planners, and other specialists. These following environmental issues were studied in detail in the DEIS:

- o Natural Environment Resources
 - Groundwater Availability
 - Surface Waters (Erosion)
 - Air Quality
- Bighorn Sheep
- Desert Tortoise
- Utah Prairie Dog

- Mining Claims
- Native Vegetation
- Pronghorn Antelope
- Sage Grouse
- o Human Environment Resources
 - Employment and Labor Force
 - Earnings
 - Population
 - Housing
 - Public Finance
 - Education
 - Health Services
 - Public Safety Services
 - Urban Land Use
 - Quality of Life
 - Transportation
 - Energy
 - Rare Plants
 - Aquatic Species
 - Wilderness
 - Land Ownership (Private)
 - LandUse (Irrigated Crop-land)
 - Ranches and Homes
 - Grazing
 - Recreation
 - Native American (Cultural Resources)
 - Native American (Water and Land Use)
 - Native American Migration
 - Archaeological and Historical Resources
 - Paleontological Resources
 - Construction Resources

The following figures summarize overall short and long-term impact significance trends (Figures 5 and 6). The conclusions implicit in these figures are broad ones, and each figure has limitations which are spelled out in footnotes. The information contained in the figures is based upon available data, the analyses contained in the DEIS and scientific judgment.

Mitigations

Mitigations are measures that are undertaken to minimize adverse environmental impacts of a project. They include programs to repair, rehabilitate, or restore the affected environment, and to reduce or eliminate impacts over time through preservation procedures or compensation. The degree to which mitigations are successful determines the significance of impacts and the relative ranking among alternatives.

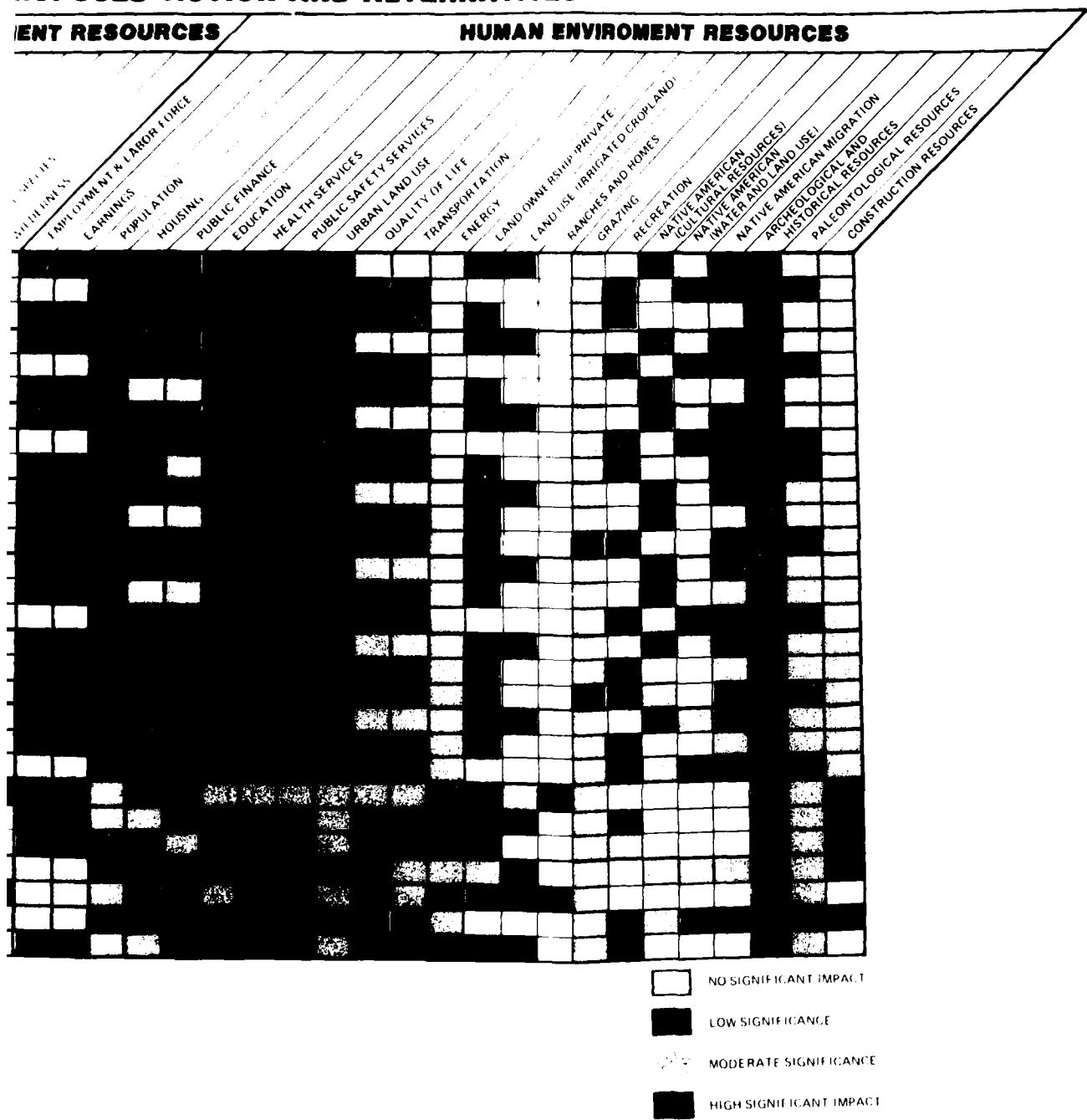
Fig 5 **SUMMARY COMPARISON OF S
BETWEEN THE PROPOSED AC**

ACTION		NATURAL ENVIRONMENT RESOURCE																							
PROPOSED ACTION (PA)	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5	ALT 6	ALT 7	ALT 8	GROUNDWATER AVAILABILITY	SURFACE WATER EROSION	AIR QUALITY	MINING CLAIMS	NATIVE VEGETATION	PRONGHORN ANTELOPE	SAGE GROUSE	BIGHORN SHEEP	DESERT TORTOISE	UTAH PEAK/HIF DOG	RARE PLANTS	AQUATIC SPECIES	WILDERNESS	EMPLOYMENT & LABOR FOR	EARNINGS	POPULATION	HOUSING
DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (NEVADA/UTAH)	DDA (TEXAS/NEW MEXICO)	DDA (NEVADA/UTAH)																	
1-OB (COYOTE SPRING/CLARK CO.)	1-OB (COYOTE SPRING/CLARK CO.)	1-OB (COYOTE SPRING/CLARK CO.)	1-OB (BERYL/IRON CO.)	1-OB (BERYL/IRON CO.)	1-OB (MILFORD/BEAVER CO.)	1-OB (MILFORD/BEAVER CO.)	1-OB (CLOVIS/CURRY CO.)	1-OB (COYOTE SPRING/CLARK CO.)																	
2-OB (MILFORD/BEAVER CO.)	2-OB (BERYL/IRON CO.)	2-OB (DELTA/MILLARD CO.)	2-OB (ELY/WHITE PINE CO.)	2-OB (COYOTE SPRING/CLARK CO.)	2-OB (MILFORD/BEAVER CO.)	2-OB (CLOVIS/CURRY CO.)	2-OB (CLOVIS/CURRY CO.)	2-OB (CLOVIS/CURRY CO.)																	

- 1 WHILE THERE MAY BE AN OVERALL ESTIMATE OF NO IMPACT OR LOW IMPACT WHEN CONSIDERING THE DDA REGION AS A WHOLE, IT MUST BE RECOGNIZED THAT DURING SHORT TERM CONSTRUCTION ACTIVITIES, SPECIFIC AREAS OR COMMUNITIES WITHIN OR NEAR THE DDA COULD BE SIGNIFICANTLY IMPACTED. THESE LOCAL IMPACTS ARE ANALYZED ON A HYDROLOGICAL SUBUNIT OR COUNTY BASIS IN CHAPTER 4.
- 2 THE REDUCTION IN DDA SIZE FOR NEVADA/UTAH UNDER ALTERNATIVE 8 DOES NOT NECESSARILY CHANGE THE SIGNIFICANCE OF IMPACT ON A SPECIFIC RESOURCE. MANY IMPACTS OCCUR IN A LIMITED GEOGRAPHIC AREA WHICH IS INCLUDED IN BOTH THE FULL AND SPLIT DEPLOYMENT DDAs, OR ARE SPECIFIC TO THE OB SUITABILITY ZONE.

ARISON OF SHORT-TERM IMPACT SIGNIFICANCE

PROPOSED ACTION AND ALTERNATIVES^{1,2}



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**Fig 6 SUMMARY COMPARISON OF LONG TERM
BETWEEN THE PROPOSED ACTION AND**

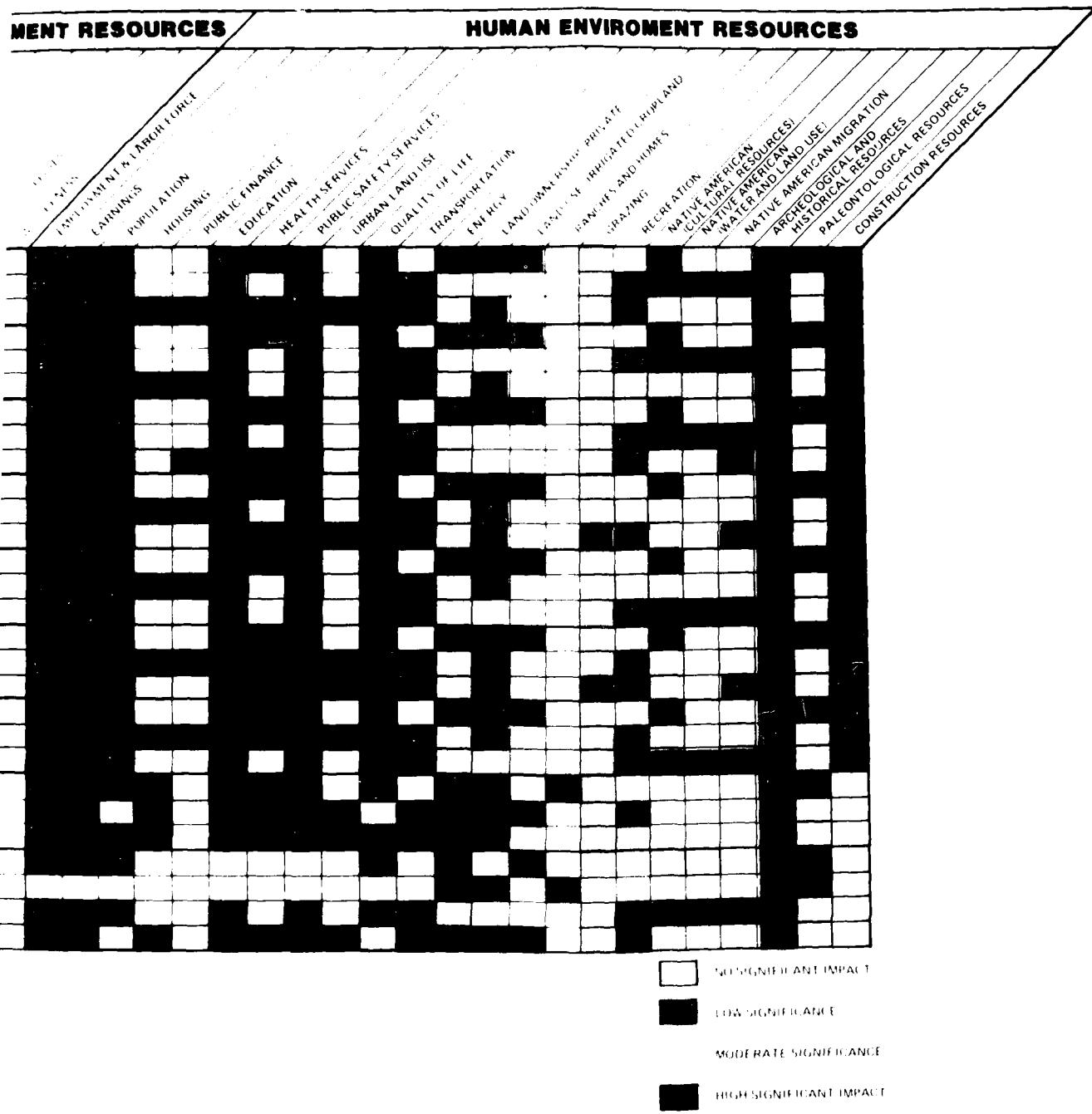
ACTION		NATURAL ENVIRONMENT RESOURCES																		
PROPOSED ACTION (PA)	DDA (NEVADA UTAH) 1 OB (COYOTE SPRING CLARK CO) 2 OB (MILFORD BEAVER CO)	NATURAL ENVIRONMENT RESOURCES																		
		GROUNDWATER AVAILABILITY	SURFACE WATER (EROSION)	AIR QUALITY	MINING CLAIMS	NATIVE VEGETATION	PRONGHORN ANTELOPE	SAGE GROUSE	BIGHORN SHEEP	DESERT LUPIN	UTAH PRAIRIE DOG	RARE PLANTS	AQUATIC SPECIES	WILDERNESS	EMPLOYMENT & LABOR FORCE	EARNINGS	POPULATION	HOUSING	PUBLIC FINANCE	EDUCATION
ALT 1	DDA (NEVADA UTAH) 1 OB (COYOTE SPRING CLARK CO) 2 OB (BERYL IRON CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 2	DDA (NEVADA UTAH) 1 OB (COYOTE SPRING CLARK CO) 2 OB (DELTA MILLARD CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 3	DDA (NEVADA UTAH) 1 OB (BERYL IRON CO) 2 OB (ELY WHITE PINE CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 4	DDA (NEVADA UTAH) 1 OB (BERYL IRON CO) 2 OB (COYOTE SPRING CLARK CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 5	DDA (NEVADA UTAH) 1 OB (MILFORD BEAVER CO) 2 OB (ELY WHITE PINE CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 6	DDA (NEVADA UTAH) 1 OB (MILFORD BEAVER CO) 2 OB (COYOTE SPRING CLARK CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 7	DDA (TEXAS NEW MEXICO) 1 OB (CLOVIS CURRY CO) 2 OB (DALHART HARTLY CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
ALT 8	DDA (NEVADA UTAH) DDA (TEXAS NEW MEXICO) 1 OB (COYOTE SPRING CLARK CO) 2 OB (CLOVIS CURRY CO)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

1. WHILE THERE MAY BE AN OVERALL ESTIMATE OF NO IMPACT OR LOW IMPACT WHEN CONSIDERING THE DDA REGION AS A WHOLE, IT MUST BE RECOGNIZED THAT DURING SHORT TERM CONSTRUCTION, ACTIVITIES SPECIFIC AREAS OR COMMUNITIES WITHIN OR NEAR THE DDA COULD BE SIGNIFICANTLY IMPACTED. THESE LOCAL IMPACTS ARE ANALYZED ON A HYDROLOGICAL CYCLOMETERIC BASIS IN CHAPTER 4.

2. THE REDUCTION IN DDA SIZE FOR THE DDA - 1AH UNDER ALTERNATIVE R DOES NOT NECESSARILY CHANGE THE SIGNIFICANCE OF IMPACT ON A SPECIFIC RESOURCE. MAY IMPACT OCCUR IN A LIMITED GEOGRAPHIC AREA WHICH IS UNDETERMINED, BOTH THE FULL AND SPLIT DEPLOYMENT DDA ARE ANALYZED IN THE DDA - 1AH REPORT.

PARTITION OF LONG TERM IMPACT SIGNIFICANCE

PROPOSED ACTION AND ALTERNATIVES^{1,2}



System layout and construction phasing largely determine the magnitude and location of potential impacts. Construction demonstration tests conducted in Arizona during 1978 showed planning was a major factor in the successful mitigation of environmental impacts. Evaluation teams of biologists and archaeologists conducted field surveys in advance of construction. Sensitive areas such as archaeological or historic sites, threatened and endangered species habitats, etc., were avoided. Direct and indirect environmental impacts adjacent to roads were limited through strict enforcement of construction corridor constraints. The successful application of these construction oversight techniques has demonstrated the ability to reduce potential for both direct and indirect impacts.

The Air Force has already begun environmental planning for M-X deployment using the mitigation-by-avoidance technique to minimize impact to highly sensitive lands and environmental features. Large areas have been studied to identify sensitive locations, and expanded field research programs are under way. System layouts were designed to avoid Indian reservations; federal and state parks, monuments, forests, grassland, historic sites, and game preserves; unique public recreational, historic, and natural areas; all wilderness areas (including BLM-designated and recommended study areas); U.S. Forest Service RARE II wilderness recommendations, administratively endorsed wilderness proposals, and designated wilderness areas; playas; registered national landmarks and archaeological sites; unique and nationally significant wildlife ecosystems; known locations of rare plants; and locations of protected aquatic species. In addition, oil and gas fields, known strippable coal, oil shale, and uranium deposits, geothermal resource areas, pipelines, buried or surface electrical and communication lines, and major state and federal highways were avoided to reduce the potential for impacts on resource competition and or constraints on future local opportunities resulting from M-X system deployment or operation.

Other measures include the use of existing roadways having average daily traffic volumes of less than 250 vehicles, which reduces the area disturbed by cluster road construction as much as 20 percent in some locations, thereby minimizing potential impacts on vegetation, cultural, and archaeological resources. Preliminary construction scenarios have been developed and time-phased with other major projects. Adverse impacts will be minimized by building portions of the system in a sequential fashion over widespread areas.

Environmental considerations will continue to influence specific system siting layout, construction, and operation. This EIS represents a base for a continuing effort to provide additional information for deployment area selection and subsequent site specific determinations. Mitigation by avoidance, environmental assessments, mitigation identification, and monitoring programs to ensure compliance will continue to be important throughout the life of the program. The Air Force will establish a monitoring/compliance plan that will assure conformity between the EIS process and site-specific resources protection. It will provide means of evaluating the accuracy of impact predictions, discovering unanticipated effects, identifying new mitigative requirements, and ensuring implementation of mitigations planned.

NATURAL ENVIRONMENT RESOURCES

Groundwater Availability

Nevada/Utah

In both states, approval of the State Engineer is required to pump groundwater. The Air Force will follow state law and is submitting applications for groundwater rights.

Based on existing information, the annual recharge capacity of most valleys in Nevada/Utah is fully appropriated. Should all approved M-X groundwater applications actually be utilized, there would be lowering of groundwater during construction. This could cause reduced spring flows, interference with existing wells, reduction of regional groundwater flow and water quality, and even land subsidence. Except near OBs, impacts during construction would be temporary and the aquifer could be expected to recover after M-X use ends. Requirements for water in the deployment area during the years the system is operated are not significant.

While OB construction water requirements are not very large, the operating base requirements are believed to exceed recharge capacity at Coyote Spring Valley, NV, and in the vicinity of Milford, UT. The water in the vicinity of Coyote Spring Valley is part of a system used by the Moapa Reservation Native Americans for irrigated farming, which is their economic base.

The Milford OB site has a declining water level due to overdrafting and it is unlikely that new appropriations of groundwater would be authorized. Water for the OB use would probably have to be purchased from existing agricultural users. This could potentially remove approximately 2,000 acres from irrigated farm use.

Texas/New Mexico

Even without M-X overdraft of groundwater is occurring, but the withdrawal rate is expected to decrease about 7 percent between 1980 and 2000. Increased fuel prices and receding water tables have resulted in land in certain areas being converted to less profitable dry farming even though water is available.

Deployment area construction needs are small in relation to the amount of pumping underway and should have little impact on the water table level and on the agricultural economy. Some short-term construction requirements might increase aquifer depletion rates by up to 5 percent, a significant short-term impact. The long-term impact is low throughout the area.

The Clovis OB would be located in an area of irrigated farmland. OB construction and operations could have significant long-term impacts due to aquifer depletions if no existing uses were retired. The expanded community of Clovis, competing for available water, could further impact aquifer depletion rates. Long and short-term water impacts at the Dalhart OB are low.

Mitigations

- o At Coyote Spring Valley, Nevada, , the possibility of purchasing water from Las Vegas and piping it to the OB is being reviewed.
- o Purchase existing water rights for long-term needs or lease them during construction. Owners would receive fair market value.
- o Strict water conservation and recycling programs at the OBs.

Surface Water (Erosion)

Nevada/Utah

Surface water sources are totally allocated and none is expected to be available for M-X consumption.

Construction of roads across bajadas would increase water erosion and sedimentation impacts during major storms. Erosion causes the more productive surface layers of soil to be removed, making revegetation more difficult. Engineering designs could reduce the impacts of roads which cross natural drainages.

The Coyote Spring Valley OB has a moderate short-term potential erosion impact rating. The rating is due to construction activities, moderately stable undisturbed soils, and steep slopes. The long-term impacts would not be significant if base design minimizes erosion. The Milford OB has a low potential erosion impact rating due to the generally level topography. With mitigation, there would be no long-term impacts.

At Beryl and Ely, erosion potential is high because of slope and soil characteristics. In other areas, however, soil erosion should not be a problem provided that the mitigation measures normal to good construction practices are followed.

Texas/New Mexico

Virtually all surface water in the region is appropriated and is being used. A major exception is the Ute Reservoir, which has been appropriated by the New Mexico Interstate Stream Commission but is largely unused at present. Other major surface water resources in the project area would be available only by purchase of water rights or lease of water from existing users.

Water erosion impacts would generally be low because of level topography and stable soil types. Erosion and flash flooding can occur, for example in the Palo Duro and Tierral Blanca Creek area where local areas of rolling topography exist. Revegetation of disturbed soils and appropriate engineering are expected to prevent any long-term impacts.

Split Basing

Impacts at the Coyote Spring OB and in the Nevada/Utah deployment area would be similar to those for full basing except that fewer areas would be involved. Impacts in Texas/New Mexico and at the Clovis OB would be the same as for full basing in Texas/New Mexico. Erosion impacts occur primarily at the OBs.

Mitigations (Erosion from Surface Water)

Erosion is not considered an impact of sufficient importance to be used for making choices among alternatives particularly if mitigation is effective. Mitigations include the following:

- o Minimize disturbances of surfaces and of existing drainages in final design.

- o Revegetation by seeding or application of mulch, or netting to aid in soil retention.
- o Contour trenching and borrow pits; construction of small retention basins.
- o Installation of culverts and diversion of sheet drainage to channels capable of accommodating the increased flow.
- o Construction of spreaders to redistribute sheet flow from roadways.

Air Quality

Nevada/Utah

Air quality in the basing area is generally excellent except in the urban Las Vegas Valley and in Steptoe Valley (Ely). Each fails to achieve one or more of the National Air Quality standards.

Construction in the deployment areas could cause significant short-term impacts in areas of dense shelter siting, due to operation of support facilities, equipment operation, and dust. These will generally be well within air quality standards except for construction dust. Short-term dust from construction activities could also interfere with visibility in scenic vistas from Cedar Breaks and Zion National Parks, Lehman Caves National Monument, Lake Mead National Recreation area and the proposed Great Basin National Park.

Operating bases could impact visibility as a result of dust during construction and SO_x, NO_x, or oxidant levels during operation, at Zion, Bryce Canyon, and Cedar Breaks National Parks. Community vehicular traffic at OBs could cause elevated CO levels in the vicinity of the base and support community.

Coyote Spring Valley is within 20 miles of the existing Reid Gardner coal fired power plant and the proposed Harry Allen Power Plant. Population increases in the Las Vegas Valley as a result of an OB at Coyote Spring could further affect the pollutant concentration there. Fugitive dust during construction could aggravate the particulate problem in the valley. The result could be a requirement to obtain emission offsets by paying for pollution control equipment at other government facilities or even for private emitters of pollutants. Overall, the air quality impact from the Coyote Spring OB is expected to be moderate.

Impacts at the Beryl OB would be low. The OB site is within 100 mi of the Cedar Breaks and Zion National Parks, but it is not near any areas designated nonattainment for pollutants. The Delta OB is ranked high for short-term impacts and moderate for long-term impacts. The Ely OB in the Steptoe Valley, a non-attainment area, is assigned a high-impact rating in the short term and a moderate-impact rating in the long term.

Texas/New Mexico

Fugitive dust emission impacts would be of primary concern both during the short and long term. Fugitive dust emissions from construction activity and the stationary sources that process construction materials at the construction camps will cause excessive localized particulate concentrations. Preliminary evidence also indicates that elevated NO_x levels would result from construction camp power generators. Counties with construction camps are expected to have moderate to high air quality impact in the short term.

For the long term, impacts in the OB counties of Curry and Hartley are rated moderate because of increased CO concentrations from vehicles and space heating-cooling emissions. The M-X system could impact on visibility at existing and proposed Class I (pristine air) areas of White Mountain, Pecos, Wheeler Peak, and Capulin Mountain, since portions of the systems are within 100 miles of these locations.

Split Basing

The impacts are essentially those described above for deployment and at Coyote Spring Valley and Curry County.

Mitigations

- o Dust suppression during construction will be used; methods that do not consume water will be used to the maximum extent practicable.
- o All facilities will comply with federal, state, and local pollution control standards.
- o Disturbed areas will be reclaimed or stabilized to minimize dust generation following construction.
- o Mass transit could be used at operating bases to minimize emissions for vehicular traffic.
- o Use of non-polluting energy resources (e.g., solar, wind, geothermal) would decrease emissions.

Mining Claims

Nevada/Utah

Estimates indicate a 60 percent growth in the mining industry in Nevada by the year 2000; an increase of about 20 mines. Old deposits will be reopened as the value of minerals exceed economic thresholds. Controlling factors would be the accessibility of the locations, the availability of water, and the availability of skilled labor.

Increased values of precious metals which makes previously uneconomic mining properties valuable have created a mining boom in Nevada and Utah. Although siting decisions will avoid known mining areas, it is possible that valuable ore deposits in bedrock under valley fill could not be developed by open-pit methods. Individual claims worked part-time as recreation or income supplement may also be displaced, though this is unlikely. Review of potential conflicts during the siting process should avoid any significant impact.

M-X deployment could slow the boom because mining would have to compete with M-X for labor, materials, and equipment. In the long term, the M-X system would provide an improved heavy-duty road network, which would be available for present and future mining operations. This long-term benefit is estimated to outweigh the short-term competition for resources.

The Coyote Spring Valley OB is in an area of little mining activity and few mining claims; low impacts are predicted. The Milford OB vicinity is in an area with many claims. Therefore, its location could have moderate impacts, although the economic viability of many of the claims has not been established.

The Ely OB may conflict with expansion of the Ward Mining District and possible mining in the Egan Range Mountains and valley fill. These impacts are rated moderate.

Texas/New Mexico

There is little mining activity in the area, and no significant impacts would be expected. There may be some minor location conflicts with a CO₂ gas field in Union and Harding counties. These would be investigated for conflict in site specific detail during Tier 2 (siting) studies. No impacts are expected at the Clovis OB or at the Dalhart OB. The latter is close to Hugoton gas fields but no impacts, except perhaps competition for labor, are expected.

Mitigations

- o M-X sites will avoid known significant mineral deposits.
- o Locally quarried nonmetallic building materials will be utilized to the maximum extent; e.g., stone, sand and gravel.

Native Vegetation

Nevada/Utah

Even without M-X, continued degradation of native vegetation is anticipated as a result of energy resource development, population growth, increases in recreation, and greater use of water resources. Overgrazing is projected to continue, but BLM grazing permits are being reviewed to reduce overgrazing during the next decade.

For full basing in Nevada/Utah, about 160,000 acres of vegetation would be initially removed. Approximately 5,500 to 7,500 acres of native vegetation would be removed at each operating base.

Secondary effects to vegetation would result from accelerated wind and water erosion, sedimentation, soil compaction, deposition of excavated materials, altered surface water flow patterns, groundwater drawdown, and increased fugitive dust. The most significant of these effects are likely to be localized near cleared areas.

Weedy species would spread into the disturbed areas. Halogeton, a weed toxic to livestock, becomes quickly established after disturbance, but can be partially controlled by comprehensive revegetation procedures.

The rate of natural revegetation depends on precipitation, intensity of erosion, and the response of reestablishing species. Natural recovery is not expected within the lifetime of the M-X project. The rate of vegetation recovery could be greatly accelerated with the implementation of a comprehensive revegetation program, including soil reapplication, seeding and mulching, irrigating, and minimizing repeated disturbance.

Texas/New Mexico

Full deployment in Texas and New Mexico affects approximately 150,000 acres of cropland and intensively grazed rangeland. Native vegetation exists only as small patches scattered throughout range and farmland. Recovery of disturbed native vegetation occurs more rapidly in Texas/New Mexico, and the difficulty and cost of implementing a revegetation program are significantly less for this project area compared to Nevada/Utah.

Split Basing

Split basing would result in the removal of native vegetation from about 85,000 acres in Nevada/Utah and 50,000 acres in Texas/New Mexico. Impacted areas would be approximately half of those for full basing in each area. Wherever native vegetation is removed, the impact would remain in that area the same regardless of alternative selected.

Mitigations

A vegetation reclamation program will be implemented. It will consider:

- o Excavation and reapplication of surface soil where tests indicate subsoil will not support plant growth.

- o Correction of nutrient deficiencies (identified by analysis of soils) with fertilizers in a manner which avoids rapid seeding growth and prevents water stress.
- o Revegetation using native or adapted species.
- o Establishment of a monitoring program to identify and treat locations requiring additional erosion control, planting, and vegetation management.

Pronghorn Antelope

Nevada/Utah

Impacts on the pronghorn antelope result from physical invasion of key habitat (the areas most frequented by the animals) and temporary reduction of range in the vicinity of construction because the pronghorn in uninhabited areas avoid people. The pronghorn is found throughout much of the DDA, so these impacts are significant. Population increases would tend to increase recreational activities, including hunting and ORV use, and could result in poaching. The consequences to the pronghorn of range reduction and various forms of people pressure would be a reduction in their numbers, which would also affect hunting, photography, and wildlife observation.

Short-term habitat loss was assumed to occur one mile from all M-X activities. In 18 valleys, the short-term loss of key habitat would be 40 percent or larger. Short-term loss of range (a larger area where pronghorn might be found) exceeded 30 percent in 11 valleys. Both impacts would be significant and adverse. Long-term impacts, however, are expected to be quite moderate as the pronghorn return to their haunts after construction activity ceases.

The Coyote Spring Valley OB is not within a pronghorn antelope range, but the Milford OB would eliminate up to 4,500 acres, over half of the key habitat in the immediate area. Additional key habitat would be disturbed by human activity, so the result could be the disappearance of the species in the OB vicinity. Impacts of the Beryl OB would be similar, but less intense; no key habitat would be lost.

Neither Delta nor Ely OBs affect pronghorn range. Indirect impacts could occur at all OB locations from ORV use and illegal hunting.

Texas/New Mexico

Direct project effects would be limited to areas of overlap in rangeland in four counties in Texas and seven counties in New Mexico. Key habitat data were not available. The operating base at Clovis is not in pronghorn antelope range, and no other large-scale projects are expected to contribute impacts.

Due to the higher level of human disturbances already present in Texas and New Mexico, pronghorn tolerance to human activity is greater than in Nevada/Utah, comparatively reducing impacts. Although direct and indirect impacts to pronghorn similar to those caused by the Proposed Action could happen, none are predicted.

Split Basing

Overall impacts could be reduced, since the Coyote Spring Valley OB does not impact the pronghorn antelope, and fewer valleys containing pronghorn range are involved in the DDA.

Mitigations

- o Establishment of new habitat through water development

- o Limiting ORV use in pronghorn habitat.
- o Prohibition of high-power rifles in construction camps.
- o Timing of construction activities to avoid key habitat during critical summer months.
- o Increased policing for poaching.

Sage Grouse

Nevada/Utah

M-X project elements would overlap the sage grouse range in 21 valleys, with losses of 3 percent of the range or less. Key habitat occurs within 1 mile of system elements in 14 valleys. The Kobeh Valley has the potential of being heavily impacted by construction, losing 13 to 29 breeding grounds, 5 of 18 brood-use areas, and over 160 acres of wintering ground habitat. From these physical area reductions and high human activity, the sage grouse population could decline up to 50 percent. Because the Nevada Department of Wildlife considers any loss of key habitat a significant impact, the 14 valleys in which potential loss would occur are regarded as high impact.

No significant impacts would be expected at the Coyote Spring Valley OB, but indirect population impacts from the Milford OB would be expected to spill over into adjacent valleys and could have significant impacts in Beaver, Parowan, Hamlin, and Spring valleys. The Beryl OB would cause significant impacts in valleys near the base due to ORV use and hunting. The Delta OB would not directly impact the sage grouse, but ORV use nearby could severely impact habitat. Significant impacts would occur at the Ely OB, and sage grouse populations could be reduced by a large percentage. The Ely OB would cause the most severe impacts on the sage grouse of any alternative.

Texas/New Mexico

No sage grouse are found in the deployment area. The lesser prairie chicken is a comparable species found in five counties. Short-term impacts are expected, although habitat will be reoccupied once construction ends and lands are revegetated. Complete recovery may not be possible and populations may be reduced.

Split Basing

No impacts are expected at the Coyote Spring Valley OB or in Texas/New Mexico. In the Nevada/Utah DDA, key habitat would be destroyed in three valleys compared to 12 for the Proposed Action. These three valleys have significant adverse impacts, but it is anticipated that the sage grouse might recover to near pre-project levels over time. The comparable Texas/New Mexico lesser prairie chicken will have similar but lesser impacts to those described in Alternative 7.

Mitigations

The single most effective mitigation would be avoidance of key habitat. Improved policing of ORV activity and hunting could reduce population decline as well but not as much as avoiding key habitats.

Bighorn Sheep

Nevada/Utah

Bighorn sheep are found in only a few mountain ranges in the potential deployment area. The only direct project effects would occur at the Coyote Spring Valley OB. Indirect effects (activity near water holes, hunting, ORVs, and poaching) would be expected at Lone Mountain and in the Grant Range, Snake Range, and Delamar Mountains, as well as in the vicinity of the Coyote Spring Valley OB. The level of reduction of bighorn sheep from construction and operations in the DDA is predicted to be low, because much of the preferred habitat of bighorn sheep is inaccessible to humans or in areas with no other attractive features, such as fishable streams or camping facilities.

The Coyote Spring Valley OB conceptual layout would not intersect bighorn range, but the road between the OB and support community would intersect the migration route between the Meadow Valley Mountains and the Arrow Canyon Range. Increased traffic on this road could increase the rate of road-kills in the area. Development of a base community in the southwestern portion of the Meadow Valley Mountains would cause a significant loss of habitat. Shifting the base location farther north or east within the suitability zone could also cause a significant loss of habitat.

Coyote Spring Valley OB indirect effects would occur in surrounding mountain ranges. Most bighorn sheep in the state are in the Sheep Range, within 10 miles of the OB, but road access is limited. Road access is fairly good for the Delamar, Meadow Valley, and Arrow Canyon mountains. Recreational activities of construction and operations personnel in these areas, particularly in summer could reduce bighorn sheep population levels through interactions at water sources or by illegal hunting.

No impacts are predicted at any other OB locations.

Texas/New Mexico

No bighorn sheep occur in this deployment area so no impacts would occur.

Split Basing

Impacts would be essentially the same as full deployment in Nevada/Utah, since they are primarily at the Coyote Spring Valley OB.

Mitigations

Mitigation measures to reduce indirect impacts to bighorn sheep would be prohibiting high-powered rifles among construction workers and restricting recreational use of bighorn watering sites during the summer.

Desert Tortoise

Nevada/Utah

Because of its relative rarity and declining population, the desert tortoise is state-protected in Nevada. Any loss of desert tortoise is considered a significant impact. The Coyote Spring Valley OB would impact over 7,500 acres of tortoise habitat, and the new railroad connecting the OB to the Union Pacific line in the east would impact more. In addition, potential mitigations to traffic effects could require a new multilane highway connecting Coyote Spring Valley with I-15, further affecting tortoise range. Direct impacts of a Coyote Spring Valley OB could result in the loss of more than 2,000 animals.

Significant indirect impacts would also be expected. Illegal collection would have severe effects and would be difficult to prevent. Tortoise densities would be greatly reduced within a half mile of all roads and intensive ORV use would collapse burrows, destroy vegetation, and otherwise destroy animals and their habitats.

Texas/New Mexico

The desert tortoise does not occur in the area, and so there will be no impacts.

Split Basing

The impacts would be the same as discussed above.

Mitigations

- o Restrict ORV use in Coyote Spring Valley.
- o Enforce state laws prohibiting tortoise collection.
- o Move animals to non-affected areas.

Utah Prairie Dog

Nevada/Utah

Indirect effects on the Utah prairie dog could result from human activity in the Utah portion of the deployment area. Campgrounds and other recreation areas east of Milford would attract people, possibly disrupting prairie dog habitat in that area. However, most of the prairie dog habitat in that area is on private land and access is likely to be restricted. The indirect effects in this area may cause a slight reduction in the Utah prairie dog population, probably less than one percent. Most of the reduction would be within one mile of major highways.

Since no M-X facilities infringe on prairie dog towns, the only effects anticipated from M-X construction and operation would result from human activity in Pine Valley, north of the Beryl OB, the only valley within the deployment area supporting this species. Prairie dog towns there can be reached by an existing road and populations could be reduced by shooting and ORV use. Because the Utah prairie dog is a federally listed endangered species, impact potential is considered significant; however, the predicted level of impact is judged to be very small.

Texas/New Mexico

Utah prairie dogs do not occur in Texas or New Mexico.

Split Basing

Since Pine Valley remains in the DDA, the effects there are the same as for full basing in Nevada/Utah; the indirect effect in Parowan Valley is not anticipated since there would be no OB in Utah.

Mitigations

- o Construction contractor could prohibit firearms around the construction camp.
- o Land manager could restrict ORV use and police the restricted area.

Rare Plants

Nevada/Utah

Construction activities would result in the inadvertent removal and damage of rare plants and the destruction and alteration of rare plant habitat. The Nevada/Utah conceptual DDA layout intersects 28 recorded locations rare plant species and about 20 percent of all known rare plant locations within the project area. A substantial decrease in the total abundance of some rare species could occur. The removal of rare plants and the degradation of rare plant habitat may occur at considerable distance from the DDA, due to off-road vehicle use and population growth-related activities such as town expansion or recreation.

At the Coyote Spring Valley OB one rare plant species is located within two miles of the conceptual OB location. One plant species recommended for listing as threatened is in the Delta OB suitability zone. At the Ely OB, no direct impacts are expected for the proposed base location, but three rare plant species occur within the suitability zone. No direct impacts to rare plants are predicted in the Beryl or Milford OB suitability zone.

Texas/New Mexico

No federal or state listed rare plant species are known to be in the area.

Split Basing

Thirteen percent of the known rare plant locations within the project area could be affected directly.

Mitigations

- o Reduce direct impacts through avoidance of rare plant locations and habitat in Tier 2 site specific studies.
- o Establish erosion control and vegetation restoration programs.
- o Restrict construction to designated areas.
- o Restrict ORV uses near roads and facilities.

Aquatic Species

Nevada/Utah

Habitat conditions in many isolated springs and streams in the study area have been degrading, primarily from irrigation and livestock water use. Additional future stresses from projects such as the White Pine Power Project, with its large groundwater withdrawals, can be expected to reduce further the viability of some endemic aquatic species populations.

M-X could impact federal and state-protected aquatic species through reduction or change of habitat by groundwater withdrawals, particularly in the White River Valley system. Moapa and Pahranagat Valleys in that system have the greatest potential for adverse impacts. Most of these impacts would be the result of inter-basin groundwater flow, a factor not well researched as yet. Direct impacts in White River Valley upon the habitats of protected fish are not expected to be significant since these fish occur elsewhere, and impacts could be easily mitigated.

Only in Railroad and Snake Valleys would project structures come within 1 mi of protected species' habitats. Habitats of the Mormon White River springfish, Pahranagat roundtail chub, and White River springfish occur within 5 mi of the DDA. Direct impacts to those species would not be expected to be significant. Increased fishing could impact the last known habitats of a pure strain of Lahontan cutthroat trout in the Reese River headwaters, adjacent to some of the western-most construction areas (Big Smoky Valley, etc.), and the Utah cutthroat trout in the mountains bordering the Spring and Snake Valleys. Restricting access to these trout habitats could reduce impacts.

The OB at Coyote Spring would increase the potential for direct and indirect impact to protected aquatic species in the Pahranagat Valley and Muddy Springs.

Groundwater withdrawal is expected to have only localized and minimal effects on the relict dace. However, if the M-X OB were at Ely and the proposed White Pine Power Project were constructed in Steptoe or White River valleys, there could be potential for cumulative effects of groundwater withdrawal on at least the southern portions of the Steptoe Valley relict dace populations at Grass Spring, Steptoe Ranch Spring, and Steptoe Creek.

The single population of pure strain Utah cutthroat trout in Goshute Creek, 60 mi north of the OB could be significantly impacted by fishing.

Texas/New Mexico

No significant impacts are expected.

Split Basing

Split basing would reduce Nevada/Utah impacts compared to full Nevada/Utah deployment. Groundwater withdrawal effects are expected to be less in White River Valley. Recreational effects will be on a small scale. Effects of recreation on the Lahontan cutthroat trout will be eliminated, since Big Smoky Valley is well to the west of the DDA. Significant impacts are still expected at the Moapa Spring OB.

Mitigations

- o Executive orders 11988 and 11990 will be followed when M-X facilities are likely to impact flood plains and wetlands. Prior to siting of M-X facilities, floodplains and wetlands will be inventoried and alternatives to siting in the floodplains the wetlands will be explored. Public comments on proposed siting and alternatives will be requested and evaluated prior to site specific decisions.
- o Regular monitoring of key aquatic habitats will be conducted to detect potential adverse changes in water supply caused by project-related withdrawals. Appropriate actions will be taken to ensure the maintenance of such habitats and the species therein should adverse changes be detected.
- o The most effective mitigation measure that could be instituted would be setting aside Goshute Creek as a preserve for the Utah cutthroat trout and not allowing fishing.

Wilderness

Nevada/Utah

Possible BLM wilderness areas in the region are approximately the size of Delaware, but final determinations on these lands will not be completed until 1991. The proposed Great Basin National Park, also near the DDA, could potentially bring nearly one million visitors into the region each year.

Over 60 percent of all BLM Wilderness Study Areas are within one mile of M-X project features. M-X construction would compromise key wilderness qualities of naturalness and solitude. Scenic values would be damaged by surface scarification, and noise levels and dust would increase. M-X roads, radar towers, and other facilities would be visible from nearby wilderness areas. Improved access to wilderness by M-X roads would reduce primitive/natural qualities because of increased recreational visits. The projected levels of visits after M-X is complete is nearly twice that of designated wilderness adjacent to the region, which currently have visiting densities considered excessive. However, a contrasting view is that the improved access from M-X roads would facilitate enjoyment of this element of our national heritage by more people. The overall consequence of the project would be a short-term reduction in the wilderness character of the Great Basin, through noise and construction dust, and long-term effects on scenic vistas, which would be irreversible and irretrievable.

Three elements of the Coyote Spring Valley OB would directly impact a designated Wilderness Study Area (WSA). These impacts might be reduced by changing the projected facility locations within the area, but some conflict is nearly unavoidable. Since the base cannot be constructed on land designated as wilderness, modification may be needed in the WSA before it is submitted to Congress for formal Wilderness designation.

Texas/New Mexico

The inclusion of Mescalero Sands and Sabinosa designated Wilderness Study Areas in the Wilderness System will be decided in the near future. Both are in the vicinity of the DDA. Due to the low physical relief of the proposed siting area, visual impacts would be minimal. Construction noise impacts would be significant, as in the Proposed Action, but would occur at only two WSAs. Radar towers could moderately reduce the aesthetic value of the Mescalero Sands designated WSA.

No impacts to wilderness are expected at the Clovis or Dalhart OBs, both over 200 miles from the nearest WSA.

Split Basing

Impacts to Wilderness in Nevada/Utah would be reduced by 40 percent compared to the Proposed Action. The impacts to Texas/New Mexico would not change.

Mitigations

- o USAF will establish education programs to insure people associated with M-X are aware of sensitive wilderness features.

- o When possible, USAF will provide a minimum of one mile buffer zone between project features and the perimeter of each Wilderness and Wilderness Study Area.

Employment and Labor Force

Nevada/Utah

Major anticipated activities without M-X are primarily associated with mineral extraction and processing and/or electrical energy production. In the Nevada study area four large projects are anticipated to occur during the next decade, and in the Utah study area six anticipated projects are expected to have direct employment effects.

With M-X deployment, an estimated 30,000 persons would be directly employed during the peak of project activity, from 1986 through 1988, with a long-term employment level of 13,200 starting in 1991. Indirect jobs would be created by project payroll spending and procurement from local suppliers. The cumulative direct and indirect regional employment short-term impacts of M-X and other large projects could be as much as 77,000 jobs with regional unemployment declining and an acute shortage of workers. Long-term total M-X-related direct and indirect employment would be 18,000 to 19,000 beyond 1990 and other large projects could add another 10,000.

With the Proposed Action, Clark County (site of the Coyote Spring Valley OB) would experience a peak of 24,600 jobs in 1986, 10 percent of the projected baseline employment. In the long term, M-X would generate 10,700 jobs in Clark County, 3.5 percent of baseline. The large labor demand for OB (and DDA) construction would result in temporary labor shortages, wage escalation, and a projected in-migration of over 11,500 workers in 1986.

Beaver County (site of a Milford OB) would experience estimated peak increases in employment of 13,600 in 1986. Long-term jobs would be 7,600. Peak M-X employment would be six times the projected employment without M-X or other projects. In less than a decade, this rapid growth would transform the slow-growing, agriculture-dependent local economy of Beaver County into a predominantly service- and trade-oriented economy. Other projects could raise cumulative peak employment to 10,800 jobs above trend-growth conditions.

Economic dislocation and localized inflation of wages, expansion of services, and rapid increase in land values would accompany rapid growth and economic structure change. The existence of national chain stores in medium-sized communities throughout the DDA should keep the prices for durable and non-durable goods competitive. The extent of the economic dislocation would depend on the timeliness and implementation of planning and growth management.

In Eureka County, DDA construction would create peak employment of 3,500 in 1988, five times the baseline. Nye County would have similar growth with employment peaking in 1988 at 6,400 jobs. Spillover impacts from the Coyote Spring Valley OB could add to DDA construction effects on employment in Lincoln County.

The Utah counties of Iron, Millard, and, to a lesser extent, Juab would have insignificant DDA and OB long-run employment impacts. However, short-run, high-level employment conditions are projected for Millard and Juab counties. In Millard County, growth from the Intermountain Power Project could further increase the related impacts.

With an OB site at Beryl (Iron County), total employment in Iron County would peak at 8,800 in 1989, 100 percent above the baseline. Long-run employment would equal 5,700. Cedar City would likely get much of the local growth.

A Delta (Millard County), Utah, OB would create an estimated peak M-X employment in Millard County of 12,400 in 1988 and long-run employment of 6,600. Including IPP and other projects, employment in 1988 would be 15,100 jobs, 2,700 more jobs than with M-X alone. Over the long run, these other projects add about 1,100 jobs. Since Delta is currently organizing for growth associated with IPP, the long-term increased growth combined with M-X economic diversity may be better handled here than at any location other than Coyote Spring Valley.

If OBs were located at Beryl, Utah, and Ely (White Pine County, Nevada), Iron County, Utah would reach a projected peak employment of 12,200 in 1986, dropping to a long-term figure of 7,600 a few years later. White Pine County employment would peak in 1987 at 11,200 jobs. Its long-term M-X employment would be 7,100. Clark County, Nevada would peak at 8,600 jobs in 1986, 16,000 less than with a Coyote Spring OB. Iron County would reach peak employment of 12,200 in 1986, almost 11,000 jobs above those associated with the Proposed Action.

Texas/New Mexico

Major anticipated employment activities in the study area are associated with electric power generation, highway expansion, and carbon dioxide and coal slurry pipelines.

With M-X deployment and peak project activity during 1986-88, impacts in many affected counties are expected to be small relative to baseline. Bailey, Deaf Smith, Parmer, Chaves, Harding, and Quay counties would have significant short-term employment impacts but no long-term growth.

Peak employment would be approximately 53,000 in 1988, 17 percent of projected regional baseline. Unemployment rates would decline, and some labor skills would be in short supply. Long-term employment would stabilize at 18,000, roughly 5 percent of the region's baseline, and about the same as for the Proposed Action in Nevada/Utah. No other projects are considered large enough to significantly alter the impacts.

Growth would be concentrated in Curry County because of the Clovis OB. M-X employment would peak at 14,900 in 1988, double the county's baseline. In Texas, Dallam and Hartley Counties would have peak employment of 6,600 and 7,300 jobs, respectively, in 1988, three to five times normal growth. Hartley would have 4,800 long-term M-X jobs and Dallam 850.

Split Basing

For the Nevada/Utah region, estimated employment would peak at 33,600 jobs in 1986, 56 percent of that under the Proposed Action, and in the long term, 10,300 jobs would be created. Over half of all peak-year jobs and most long-term employment would be in Clark County. The net increase in Clark County employment would be just over 10,000 jobs, the same as for the Proposed Action.

For the Texas/New Mexico region, peak M-X-related employment would be 29,400 in 1987, 56 percent of full basing impacts. Regional employment growth would stabilize at 10,100 jobs in 1992. Curry, Lubbock, Potter, Randall, Chaves, and Roosevelt counties would experience short-term employment, but most long-run employment growth would be concentrated in Curry County with 8,800 jobs.

Mitigation

- o In addition to the OBs, three to six ASCs will be required depending on the deployment alternative selected. Of the total 300 employees at each ASC about 100 would be civilians who would reside in adjacent communities. Food and other supplies would be procured locally. This long-term employment and economic input should help alleviate the post-construction downturn.
- o Use of labor-saving technologies for both construction and operation could decrease labor demands.
- o Long distance commuting programs could limit impact in rural communities during DDA construction.
- o Direct incentive could be provided construction workers to locate their families in metropolitan areas.
- o Economic development planning activities at federal, state and local level would include impact aid assistance.
- o Time-phase other large-scale projects to reduce accumulative demand.
- o Encourage expansion of the economic base in areas which could be most significantly affected by differences in short- and long-term employment.
- o Encourage temporary provision of goods and services in rural areas which would have no long-term requirements.
- o Integrate local residents and businesses in community growth management planning.

Earnings

Nevada/Utah

Peak M-X-related earnings for Nevada-Utah are forecast at \$1.2 billion (1980 dollars) in 1986, then decline and level off to \$250 million by 1993, about 7 percent and 1 percent of 1978 total earnings of \$17.7 billion (1980 dollars), respectively. Historically, both states have exhibited rapid real earnings growth, 5.3 percent per year in Nevada and 4.2 percent per year in Utah for 1967-1977. Gains have been concentrated in the metropolitan areas of Las Vegas and Salt Lake City - Provo, while in the balance of the area total earnings have grown very slowly. A large infusion of additional income in slow growing areas is likely to trigger localized wage and price inflation. In addition, project employees - some construction trades, in particular - are expected to have higher gross incomes than the average for this area, tending to pull up earnings across other occupations.

Adjustment to earnings growth of the magnitude projected under M-X would not produce significant stress to large counties like Clark, Nevada but would generate some wage and price inflation, particularly in the short run and in key occupations.

Very significant growth problems in the rural counties are likely with such a large infusion of additional incomes over a short period of time. Significant increases in local land values and earnings in non-M-X sectors are likely, as are temporary shortages of some goods, services, and skilled construction labor.

Texas/New Mexico

Full deployment in Texas-New Mexico is projected to generate a net increase in earnings of \$1.1 billion (1980 dollars) in 1987. As project build-up is completed, earnings would decline and stabilize at approximately \$250 million by 1993. At the peak, M-X-related earnings would represent growth equal to about 26 percent of the region's 1978 total earnings of \$4.3 billion (1980 dollars). Over the long run, the net increase in earnings would be about 6 percent of 1978 levels.

The Texas-New Mexico area is basically rural, and historically has exhibited modest economic growth. Metropolitan concentrations include Amarillo in Potter/Randall counties, Lubbock in Lubbock County, Clovis in Curry County, Portales in Roosevelt County, and Roswell in Chaves County. All of these cities except Roswell would be the focus of both short and long-run economic growth, supplying local procurement needs and meeting project worker demands. Roosevelt County would likely be most heavily impacted, because of its relatively small economic base. In addition, many counties where DDA facilities would be constructed will be significantly impacted in the short run. These include Bailey, Deaf Smith, Parmer, Chaves, Harding and Quay counties, and earnings forecasts indicate all face the potential of rapid price inflation and construction and finished goods shortages.

Curry County would experience the largest absolute gain in earnings. Peak earnings are forecast to equal \$255.3 million in 1986, slightly more than 1978 total county earning of \$254.8 million (1980 dollars). Following construction, earnings would decline and stabilize at \$121.7 million by 1992. Earnings growth of this magnitude would significantly alter the size and nature of the county's economy;

rapid wage and price inflation, changes in the county's occupational mix, and local shortages of supplier and finished goods would be likely.

Dallam and Hartley counties would share in economic expansion induced by DDA and operating base construction. Over the long run, virtually all earnings growth would occur in Hartley County, a result of employment on the base. In the short run, the net increase in earnings would peak at \$182.3 million in Hartley in 1987, and at \$223.4 million in Dallam County in 1988. In Hartley, peak earnings would be about 2000 percent of 1978 earnings of \$9.1 million (1980 dollars), while in Dallam, peak earnings would equal about 490 percent of 1978 earnings of \$45.6 million (1980 dollars). In agricultural economies, very rapid growth would result from earnings of this magnitude. Over the long run, earning by place of work would decline in Dallam County to a projected level of \$4.0 million in 1993, about 9 percent of 1978 earnings. Hartley County, the operating base location, would experience long run annual earnings equal to \$83.9 million, over 9 times 1978 total earnings. Long run project-related employment in Hartley County would induce significant economic stress and could completely change the size and nature of the county's economic base toward trade and service industries.

Split Basing

In both Nevada-Utah and Texas-New Mexico, short and long-run earnings growth would be roughly one half those projected under full deployment in either region.

The first operating base at Coyote Spring Valley will induce peak earnings in Clark County of \$281.6 million, about 78 percent of peak earnings under the Proposed Action. Over the long run, the net growth in earnings is forecast to equal \$138.8 million, only \$7 million less than under the Proposed Action. Short-run growth in earning would occur in Lincoln, Nye, Beaver, Iron, and Millard counties from DDA construction employment, significantly stressing all county-level economies and resident populations.

Curry County would receive almost as much earnings stimulus as under full basing. Designated deployment area counties include Dallam, Deaf Smith, Hartley, Chaves, Harding and Quay. Of these, only Chaves County has an economy of appreciable size. This alternative would induce significant earnings-related stress particularly during the construction period.

Mitigations

- o Carefully expand local availability of goods and services on a temporary basis by transporting them into the affected communities.
- o Other mitigation strategies would be similar to those proposed for reducing employment impacts.

Population

Nevada/Utah

Without M-X, population in the Nevada portion of the 12-county Nevada/Utah region is expected to grow at a 2.9 percent compound annual rate between 1982 and 1992, and in the Utah portion by 2.3 percent. This growth is the result of some expanded energy and mineral activities within the two states and the high birth rate, notably in Utah.

With M-X deployment, rapid, large-scale population growth generated by M-X construction would be followed by an abrupt population loss after construction. Fluctuations in population could have significant impacts on communities. The severity of the consequences of population changes that would be induced by M-X and other projects is measured in terms of departure from historical annual growth rates and deviation from projected growth without M-X. At a 12-county bistate level, M-X induced population growth would not be significant because it would be tempered by other growth. M-X growth during construction from 1983 to 1987 would increase the region's annual compound growth to 4.2 percent from the projected no-M-X rate of 3.2 percent. With other projects, the region's annual growth rate would be increased to 4.5 percent from 1983-87, but would fall to an annual growth rate of 1.1 percent from 1988 - 1991. Growth in urban counties would be proportionately moderate. Considering the combined effects of other potential projects, however, some rural counties will experience annual growth rates as high as 45 percent during the construction period followed by a steep decline. The rapid large-scale growth in the sparsely populated rural counties (totalling 566 percent in one county at the peak of construction), and the subsequent rapid population losses, would create significant population-related impacts.

Texas/New Mexico

The 25-county Texas/New Mexico region is projected to grow at a 1.0 percent compound annual growth rate between 1982 and 1994, with the 17 Texas counties growing at a 1.1 percent annual rate and the eight New Mexico counties at a 0.60 percent annual rate. Population is projected to grow by 86,000 persons, from 694,000 persons in 1982 to 780,000 persons by the end of 1994.

At the regional level with M-X, total population would grow almost 10,000 higher than in Nevada/Utah, but it would not be significant at the regional level. The construction growth period would increase the annual growth rate to 3.4 percent, compared to 1.0 percent without the project. Population losses after construction would bring declines of 0.9 percent annually for four years. Thereafter, the 1.0 percent annual growth rate would be expected to recur. In contrast to the region, county effects during the construction growth would likely be large and significant. Annual rates of population change in this period could range between 5 and 88 percent. Significant growth (up to 600 percent in one county at the peak of construction) would be followed by rapid out-migration after construction. Like Nevada/Utah, the population changes in the Texas/New Mexico rural counties would constitute fundamental change and significant impact.

Split Basing

The number of M-X-related in-migrants present in Nevada/Utah is projected to reach a maximum of 37,200 in 1986, about 45 percent of the amount forecasted for the Proposed Action. The major share of the population impact would be experienced in Nevada. Peak year impacts would remain large and significant in five counties. In Texas/New Mexico, DDA peak growth would be about 53,400 persons, 56 percent of that forecast for basing the full system in Texas. The construction growth would be significant in seven counties. In general, the impacts of population growth would be more widely distributed by split basing, hence, tend to be less at any given location, but in some rural counties they are just as large and difficult to use as with single basing area options.

Mitigations

- o Consider construction time-phasing so that M-X related population increases do not coincide with those caused by other projects.
- o Encouraging construction workers to leave their families in other areas by offering financial incentives such as housing allowances, or family separation allowances.
- o Providing assistance to local government for advanced planning to effectively manage population growth.
- o Designation of "new towns" or specific development zones to properly accommodate the permanent population growth.

Housing

Nevada/Utah

By 1994, housing unit requirements in the region are projected to total approximately 663,000, a 35 percent increase over 1982. Forty percent of these new units are anticipated to be required in Nevada, virtually all in Clark County, and 60 percent in Utah, principally in Salt Lake/Utah counties.

With M-X deployment, a housing shortage would be a major problem in growth communities. Total M-X requirements for indirect workers would be 20,000 units in 1987, a 3.5 percent increase over normal growth. With other projects, 30,300 units, 5.3 percent above normal growth, would be needed. After 1987, housing requirements would drop, leaving a surplus of 16,700 units by 1992. Most of these would be mobile homes that could be relocated out of the region.

Under the Proposed Action, Clark County, Nevada and Beaver County, Utah would need most of the housing. Clark County would need 6,860 units, a 3.3 percent increase over the normal baseline. Beaver County would require 3,630 units, 200 percent over baseline or almost 27 times the 135 additional units needed for normal growth. Long-term needs would be 1,000 units in Clark and 1,500 units in Beaver County, increases over normal growth of 0.4 percent and 76.4 percent, respectively. Lincoln County would have a peak year need for 1,000 units, a 67.8 percent increase over baseline. Millard County would be additionally impacted by other projects; M-X alone would require 1,290 units, 33 percent above baseline, but with other projects 89 percent over baseline. All other counties in the deployment region are projected to experience short-term impacts because of construction of the Proposed Action. Although short-lived, the impacts could be significant.

With an OB site at Beryl, Utah, Iron County's peak requirements are five times larger at 3,560 units, a 53 percent increase over baseline, and long-term effects are three times larger than for the Proposed Action.

An OB site at Delta (Millard County) increases Beaver County's requirements 40 percent over baseline growth in the short-term but only 12 percent in the long-term. Millard County requirements would peak at 4,800 units, or 122 percent over baseline, with long-term requirements 36 percent over baseline.

Locating an OB site at Ely (White Pine County) would require 1,600 housing units, an increase of 43 percent.

Texas/New Mexico

By 1994, housing unit requirements in the Texas/New Mexico region are projected to equal 276,000 units, an increase of 12 percent over the number of dwellings in 1982. Of the total required units in 1994, 52,000 or 19 percent are anticipated to be needed in New Mexico, principally in Charles County, and 224,000 or 81 percent in Texas, with most concentration in Lubbock and Potter/Randall counties.

With M-X deployment the peak-year housing requirements would be 23,240 units, an increase of 9 percent over the normal growth.

Hartley County (site of Dalhart OB) would have peak requirements of 2,518 units, a 171 percent increase, and long-term requirements of 972, which exceeds normal baseline by 58 percent. Dallam County would also experience large peak-year and long-term housing needs.

Curry County, with the Clovis OB, would be the most impacted. Peak requirements would be 6,130 units, 40 percent over baseline. Long term needs due to M-X would be 2,130, a 14 percent increase. Roosevelt County, adjacent to Curry County, would also experience significant peak-year impacts.

Split Basing

Nevada/Utah peak requirements would be 40 percent of those under the Proposed Action, with a similar long-term reduction. Clark County's peak year housing requirements would be 65 percent of those under the Proposed Action, although the long-term impacts would be the same.

Texas/New Mexico peak requirements would be for 12,760 units, 55 percent of those required for full basing. Impacts in Curry County would be similar to those for full basing.

Mitigation

- o The most effective mitigation of housing impacts would result from federal, state, county, and local coordinated planning, and timely private and public action.
- o Quantity of on-base military housing will be adjusted to take into account ability of local community to provide housing.
- o Temporary facilities and services should be used for construction phase whenever possible. Mobile homes should be considered as the logical way to provide temporary housing.
- o Following construction, surplus homes could convert to low cost retirement communities or second-home, recreational use.
- o Land for residential development needs to be identified, properly zoned and acquired in advance of need.
- o Mortgage financing from outside sources may be needed to offset risk to local lenders.
- o State housing authorities could be established and authorized to sell bonds for impact housing financing.
- o Various Federal housing and planning programs could be used for technical and financial assistance.
- o Land use controls should be considered including: zoning ordinances, planned unit development, sub-division controls, mobile home park standards, growth zones and boundaries, service areas for water and sewer infrastructure.

Public Finance

Nevada/Utah

Local governments do not have as wide a variety of federal and state financial assistance programs as they have had in the past. The future of federal revenue sharing programs and similar local government assistance programs is uncertain in light of recent efforts to balance the federal budget.

With M-X deployment, deficits of approximately \$13.9 million for the deployment area as a whole are anticipated in the peak year, 1986. This assumes that existing local tax rates remain constant. Though this effect is significant with respect to regional expenditures, local effects are more serious. Significant degradation of service levels would occur without outside financial aid.

The Coyote Spring Valley OB would result in peak year deficits for local jurisdictions in the Clark County area (1985) of \$3.8 million, 0.6 percent of total expenditures projected for this year. The Milford OB would result in Beaver County peak deficits of \$1.9 million in 1986. The two counties would each have long-term capital expenditure requirements in the range of \$25 to \$30 million with peak requirements of \$40 to \$50 million.

The potential for service level degradation in these areas is very high without outside aid, timely comprehensive planning, on-time construction of infrastructure, and ability to attract workers. No local jurisdiction would be able to cope with M-X growth without substantial outside assistance.

With an OB location at Beryl (Iron County), deficits of \$1.7 million are anticipated in the peak year (1986). Long-term capital expenditures would be \$24.2 million and peak year requirements, \$38.6 million. Although temporary facilities could reduce peak year costs, local jurisdictions in the Iron County area will need outside assistance.

An OB location at Delta would cause local jurisdictions in the Millard County area to have peak deficits of \$2.2 million. Long-term capital expenditure requirements would be \$25.9 million, and peak requirements, \$51.1 million.

With an OB location at Ely (White Pine County), a peak year deficit of \$3.8 million is anticipated in White Pine County. Peak year capital requirements are \$51 million and long term \$27.2 million.

Texas/New Mexico

Growth rates without M-X are projected to be relatively low and local governments will probably experience few problems providing necessary services.

With M-X deployment peak year deficits in the region as a whole would equal \$7.6 million. Capital outlays to support long-term demand for public buildings, schools, streets and, water and wastewater facilities, would equal \$76.9 million.

In Curry County, peak year deficits would equal \$1.9 million. In the long-term, after construction is over, \$1.4 million excess revenues are projected. Local jurisdictions in the Hartley County area would experience peak-year deficits of \$0.7 million.

Long-term impacts in OB counties would equal 80 percent of total capital expenditure requirements for the region. In Curry County, peak requirements are \$57.2 million; long-term requirements would equal \$36.0 million. Dallam County peak year requirements would equal \$26.5 million, and long run, \$7.5 million, with Hartley County at \$36.5 and \$6.3 million, respectively.

Split Basing

Regional impacts in each area would be substantially less than in the other alternatives since about half the total population increase would occur in each region. Impacts to communities near the Coyote Spring Valley OB and the Clovis OB would be essentially the same as for the Proposed Action and full Texas/New Mexico basing, respectively.

Mitigation

- o Several financial assistance programs are available to local governments to mitigate adverse fiscal impacts, for example:
 - Direct loans are available from the federal government, guaranteed and/or federally insured loans, and direct grants-in-aid
 - The Public Works and Economic Development Act of 1965
 - Housing and Community Development Act of 1974
 - Housing Act of 1954
 - Public Health Services Act
 - Federal School Impact Assistance
- o Federal legislation to mitigate financial impacts associated with M-X is anticipated.
- o Development of Comprehensive Plans, or updating existing plans at the earliest possible time will facilitate implementation of mitigation activities.
- o Early application for federal assistance may be necessary to reduce lead time for review and approval. Regional councils of governments could be formed to coordinate application activities and prevent unnecessary competition.

Education

Nevada/Utah

Without M-X, student enrollments and teacher requirements are projected to increase, on average, by about 2.5 percent per year over the period 1982-1992.

The impact on educational services in each area from M-X would be determined by the capacity of existing schools and the number of school age children moving to the area. Overcrowded classrooms and the demand for additional teaching staff would be significant at least in the short term. Transient new students, problems of short-term integration into the communities, and overall disruption of community infrastructure may adversely impact the learning process for all students. Estimated M-X induced peak-year and long-term teacher requirements would be significant. Due to the short-term nature of many teaching positions, it may be difficult to attract a sufficient number of teachers to the region. At the regional level, M-X induced enrollments, which would peak in 1987, generate a need for 826 additional teachers, 4.1 percent over normal growth requirements. The cumulative impact in the region due to M-X and other projects would be 1,183 additional teachers, 5.9 percent over normal. Regionally, 386 teachers would be required over the long term due to M-X and 681 with M-X and other projects.

At the county level, M-X induced enrollments would generate needs for additional teachers ranging from 0.1 percent to more than 500 percent over normal growth requirements during the peak year of M-X construction. Substantial expansion of educational facilities would be required. Subsequent out-migration will occur in a number of counties following construction, resulting in a steep decrease in total enrollments, teacher requirements, and educational facility needs.

Texas/New Mexico

Student enrollments and teacher requirements will be steady or slowly rising in Clovis and Dalhart without M-X. M-X-induced enrollments, primarily within school districts in Curry, Hartley, and Dalhart counties, would generate a peak need for 935 additional teachers (10.8 percent over baseline).

Peak enrollments at the county level would generate needs for additional teachers ranging from essentially negligible to more than five times the normal growth requirements during the peak year of M-X construction. Like Nevada/Utah the requirement for expansion of the educational facilities and the effects of rapid population out-migration after construction would cause severe impacts in the Texas/New Mexico M-X deployment area.

Split Basing

Regional requirements for additional teachers would be much less than those of the Proposed Action (348 additional teachers instead of 826 additional teachers). Significant differences between split basing and the Proposed Action occur in nine counties. Four counties can still expect a significant shortfall in teacher requirements.

Texas/New Mexico regional requirements would be for 525 teachers, a 6.1 percent increase over the normal growth baseline, in peak year 1987, or 56 percent of full basing requirements. Five counties would be significantly impacted but most of the impact is in Clovis.

Mitigations

- o Employ mobile school facilities and a pool of teachers to meet the ever-changing demands (size of enrollment and location).

Health Services

Nevada/Utah

Health care requirements and services without M-X are projected to increase in direct relation to the projected normal population growth. The level of health care delivery services tends to be substandard in rural towns, and with sudden and large M-X growth, problems could become critical.

It may be difficult to attract doctors, dentists and nurses who would only be required in peak years, while long-term requirements could likely be satisfied. The difference in short and long-term requirements would create a significant impact on health service unless necessary health care personnel are obtained.

In the region as a whole, M-X-related health services requirements would peak in 1987 at 270 personnel and with other projects, 475. Clark County, site of the Coyote Spring Valley OB would have peak requirements of 114 additional personnel, and other projects would bring the total to 122 personnel, a 3.2 percent increase over baseline. No additional health services personnel would be needed for the long term. Peak requirements in Beaver County (Milford OB) would be 55, 167 percent over baseline, and with other projects, 89 personnel. Permanent long-term need would be 13 for M-X alone or 47 with other projects.

With an OB at Beryl, Iron County would require 56 personnel, 39 percent above baseline requirements, and would have long-term needs of 13. Millard County (Delta OB) would experience peak needs of 65 personnel, 13 for the long-term.

For an Ely OB, White Pine County's peak requirements would be 78 personnel, with long-term needs at 13.

Texas/New Mexico

Peak-year health services personnel requirements for the region would be 306, an increase of 6.2 percent over the normal growth baseline, with 49 additional required in the long term.

Split Basing

Nevada/Utah regional peak requirements would be 36 percent of those under the Proposed Action with no long-term requirements.

Peak requirements would be 159 personnel in Texas/New Mexico, or 52 percent of full basing requirements.

Public Safety

Nevada/Utah

Regional requirements for public safety personnel resulting from M-X deployment will peak with a need for some 260 additional people, a 4.2 percent increase over normal growth. An additional 110 people (for a total of 370) would be needed considering other projects. Since shortfalls would not exceed 6 percent, regional impacts should not be significant.

At the county level, significant impacts on public safety can be expected as a result of local shortages of trained employees. Impacts will be most severe during the construction period when public safety services are most needed. While it may be possible to secure funding from federal, state, or other sources, it will be difficult to fill relatively low paying and temporary public safety jobs in competition with the higher paying construction and services sectors. During the peak year of construction increased public safety personnel requirements by county would range from essentially negligible to as much as 550 percent.

Texas/New Mexico

Texas/New Mexico basing has a greater impact in terms of public safety personnel than does Nevada/Utah. Increased public personnel safety requirements by county peak as high as 850 percent. For the Texas/New Mexico region, M-X-related requirements total 281 personnel in the peak year, an increase of 10.6 percent over the normal growth baseline. Five counties in Texas and two in New Mexico are severely impacted.

Split Basing

The Nevada/Utah deployment region's peak year public safety personnel requirements are only 40 percent of those under the Proposed Action. In Texas/New Mexico an additional regional requirement of public safety personnel numbering 156, which is 55.5 percent of the requirements of the full deployment option in Texas/New Mexico. There is a need for 108 temporary public safety personnel under split deployment, only 57.7 percent of the full deployment level.

Mitigations

- o Provide federal law enforcement to the extent feasible.
- o Grants for planning and for expanding services.

Urban Land Use

Nevada/Utah

Deployment of M-X will result in population-induced requirements for housing, streets, schools, parks, and other land uses. In some communities, developable land is insufficient for M-X induced needs because they are surrounded by public land. They would have to apply for expansion through BLM administrative processes.

Clark County, site of the Coyote Spring Valley OB, has 96,000 vacant acres available for development, and M-X peak growth needs 2,800 acres, so no significant impact is predicted. The Beaver County (site of Milford OB) towns of Milford, Beaver, and Minersville have 700 vacant acres of developable land and would need 1,500 temporarily, half of that for permanent expansion. Some of the need could be met by using some presently developed land for M-X induced purposes, but the additional land would largely be outside present communities, either in rural areas or new towns.

With an OB located near Beryl in Iron County, M-X requirements can likely be met as 5,000 acres of developable land are available. The rate at which land conversion would occur either from vacant to developed or rural to urban could significantly impact the county.

With an OB near Delta, the requirements for land devoted to urban uses in Millard County would increase significantly. In the peak year, about 2,017 acres of urban land would be required while the long-term demand is considerably lower at 727 acres. Millard has 3,415 acres of developable vacant, urban land, enough for M-X needs, but it is not known whether the land is located where the needs would occur.

With an OB located near Ely, White Pine County would have to meet the urban land requirements. The Ely community would have the greatest share of the project-induced demand for land development, with lesser effects in Ruth and McGill. White Pine, with about 900 acres of vacant urban land, could not meet M-X demands from available land. Conversion of present public land to urban use or increased density with a change in residential life style would be required.

Texas/New Mexico

Curry County would have to meet most of the Clovis OB urban land needs although some land would also be required in Portales, Roosevelt County. Curry County has 2,475 acres of developable vacant land, sufficient for construction phase demands and more than enough for permanent M-X use.

Hartley and Dallam counties would receive a large share of the increased demand for land in urban uses. Moore County and the metropolitan Amarillo area would also be affected. All should be able to meet M-X growth demands.

Split-Basing

Impacts in the Nevada/Utah DDA and in Clark County would be substantially the same as for the Proposed Action and at Texas/New Mexico and Curry County, the same as for full basing.

Mitigation

Urban land use impacts are primarily conflicts over use, development policies, zoning, and factors other than simple availability. It is assumed, therefore, that the physical availability of land will not cause significant impacts under any of the alternatives. Land-use conflicts can be mitigated somewhat as follows:

- o Establish impact mitigation task force with local, regional, and state officials, business representatives, ranchers, farmers, Air Force representatives, etc. to advise local and regional governments.
- o Apply for HUD 701 Comprehensive Planning Program Grants and Community Development Block Grants to support local land use planning efforts.
- o Prepare or update and adopt zoning ordinances, subdivision regulations, and comprehensive plans to guide growth.
- o Utilize land banking by municipality, county, or state to direct temporary urban facilities to suitable locations during peak construction period.
- o Establish urban service areas to ensure that urban development will take place only within designated zones.
- o Designate planned unit development (PUDs) zones where a mixture of land uses specially suited to construction workers and their families may be developed on a temporary basis, e.g., housing, recreation, neighborhood commercial, day-care facilities. Such PUDs would encourage the selection of housing by workers in suitable locations rather than in out-lying rural and/or agricultural areas.
- o Set up state assistance program to identify federal sources of funds for local and regional land use planning programs.
- o Set up state and university-sponsored training programs in land use and growth management for officials and administrators in affected local governments.
- o Provide funding for local and regional land use planning efforts (HUD 701, CBDG; EPA; EDA) and for infrastructure to support land development.
- o Provide land to be used on temporary basis for development of urban land uses (housing, neighborhood commercial, recreation, etc.) needed by construction workers and families. Land could be administered and/or leased by BLM, Department of Defense, or other federal agencies.

Quality of Life

Nevada/Utah

Present growth in the 12-county Nevada/Utah area is the result of expanded energy and mineral activities and the high birth rate in Utah. Even without M-X, the current life style of some rural small communities will be impacted by major projects. Job opportunities and increased per-capita income are expected to increase the shift from agricultural to urban.

All communities within or adjacent to the Nevada/Utah DDA will undergo a change during M-X construction which will alter the present residents' lifestyle. The smaller, static, and more homogeneous communities are the ones likely to be impacted the most. The large, dynamic, heterogeneous communities will be better able to cope with the change.

Large city suburban residents will face some inconvenience due to temporarily stressed local services. Small community and rural residents, unless they plan for the change, will find the increased crowding, diversity of cultural and religious backgrounds, and new demands upon community services during construction to be overwhelming. M-X system growth can be accommodated and the new residents successfully assimilated if the present local residents will work together with the newcomers to retain a desirable lifestyle. With the proposed M-X action Lund, Utah could look like Minersville or Milford today; Minersville or Milford like Cedar City; and Cedar City could double in size as an urban community. Although each community would change, the quality of life that appeals to residents and visitors could be retained.

Texas/New Mexico

Changes in the quality of life can be assumed to be relatively minor without M-X. The low overall rates of growth are expected to produce little social disorganization and no taxing of community services. Job opportunities and income improvements are not likely to be extraordinary, and migration of the young to larger urban centers in search of employment diversity is expected to continue.

The main differences between the Texas/New Mexico and Nevada/Utah DDAs are the population density throughout the area (much higher in Texas/New Mexico than in Nevada/Utah, though still sparse by Eastern standards), and the land ownership (nearly all private in Texas/New Mexico). These two differences highlight the key quality of life variables that would be impacted in Texas/New Mexico; private land purchase and possible relocation of people.

Split Basing

Although the regional impacts would be reduced in Nevada/Utah, counties such as Lincoln would still be impacted by a large, diverse construction workforce.

The Texas/New Mexico split-basing DDA would minimize relocation of people and would reduce impact upon irrigated agriculture. Both of these steps preserve the rural, small community quality of life that currently prevails. Thus, the net effect of split basing is to more than proportionally reduce the impacts to the prevailing lifestyles in the respective areas.

Transportation

Nevada/Utah

The highway system, primarily two lane roads but with Interstate routes on the periphery of the region, is not extensive compared to most areas of the country. Accessibility to many areas is poor. The system can accommodate projected non-M-X growth, though there could be local problems near major construction projects.

With M-X deployment, 7,200 to 7,700 miles of new roads would be built, increasing accessibility of the region from the outside and, within the region, providing access to areas now relatively remote. During construction, there will be significant local construction congestion on M-X and existing roads.

Near the OB at Coyote Spring Valley, U.S. 93 would have to be widened to four lanes between the operating base and Highway I-15. Improvements to roads connecting the Milford OB to Milford, Minersville, and Cedar City could distribute the population impacts and reduce them to potentially acceptable levels. Other minor improvements to the road systems near the two sites may be needed to accommodate localized traffic increases, especially within Milford. Use of buses and car pools and staggered work hours could reduce the level of traffic and obviate the need for major roadway improvements. In general, long-term OB-related impacts upon ground and air traffic are not expected to be significant.

The road between the Beryl OB and Beryl Junction would have to be widened to four lanes. Other minor improvements may be required, but the road system would accommodate anticipated traffic without congestion.

U.S. 50 between a Delta OB and the town of Delta would have to be widened to four lanes, but other roads in the vicinity should accommodate increases. Spot capacity improvements and improved traffic control may be required at some Delta area locations.

Near an Ely OB, traffic increases along U.S. 6-50-93 between the OB site and Ely may require widening to four lanes. Within Ely, road improvements may be necessary to avoid congestion. A White Pine Power Plant west of Ely combined with M-X traffic could require improvements to U.S. 6 or U.S. 50 west of Ely.

Texas/New Mexico

Most of the Texas/New Mexico region road network is composed of two-lane roads, but a substantial portion is four-lane. The existing system has sufficient capacity to accommodate present as well as non-M-X future needs.

With M-X deployment, accessibility within the DDA would increase. Since the road network is already extensive, additions of M-X roads are not likely to encourage more travel or more development.

Traffic at the Clovis OB would be higher than present Cannon AFB traffic, and some congestion may result along U.S. 60 unless improvements are made, especially at intersections. There may be some localized traffic problems within Clovis itself during peak periods. In order to relieve traffic along U.S. 60 an access point directly from State Route 467 may be required.

Near the Dalhart OB, the increased traffic could result in some problems in the areas of Dalhart, Dumas, and Hartley.

Split Basing

The impacts in each region will be less extensive, although impacts will be the same at the Coyote Spring OB as for the Proposed Action and at the Clovis OB as for full deployment in Texas/New Mexico.

Mitigations

- o Establishment of worker car pools.
- o Use of buses or other rapid transit modes.
- o Staggered working hours.

Energy

Nevada/Utah

The region is serviced by Regions 27, 28 and 30 of the Western System Coordinating Council. Under summer conditions peak demand is currently projected to increase from approximately 64,000 megawatts (Mw) in 1980 to 77,000 Mw in 1985 and to 89,000 Mw in 1989. Under winter conditions peak demand is projected to increase from approximately 65,000 Mw in 1980 to 78,000 Mw in 1985 and to 89,000 Mw in 1989. In general, slight decreases are projected in consumption of petroleum, natural gas, fuel oil, heating oil and gasoline for the 1980 to 1990 period. Only jet fuel consumption is projected to increase.

The electric power requirement for M-X deployment and support is small, about one percent of the projected excess power in the electric power region. Therefore, no new generating facilities would be required other than those currently proposed, which include the Intermountain Power Plant (IPP) at Delta, Utah; the White Pine Power Plant near Ely, Nevada, and the Harry Allen Power Plant proposed for a site near the Coyote Spring Valley OB site. However, transmission and distribution facilities would have to be upgraded and built in a timely manner. Upgrading of existing lines would have a minimal impact. New facilities create aesthetic and right-of-way impacts, especially in pristine areas. Potential conflicts exist between IPP transmission line routing and conceptual operational bases at the Coyote Spring Valley and Milford OBs. Alternative energy systems such as solar may produce a positive impact by reducing the electric load of the M-X system and the need for transmission lines. Additionally, co-generation of electricity at the OB heating plant is being investigated.

Energy conservation measures will be specified in the master plans being developed for OB locations. The OB suitability zone and conceptual master plan incorporated in this analysis makes maximum use of south-facing slopes to incorporate passive solar and terrain-caused wind connections and conserve energy consumption. However, the potential for impacting sensitive archaeological areas is greater on such slopes than in valley bottoms.

The fuel requirements for the M-X system and support communities would require increases in gasoline and heating oil allocations, with the greatest increase occurring during the construction phase. However, as a result of developing alternative energy systems and using passive solar design and energy conservation techniques for new buildings during the operations phase, the impact on the national energy demand may be minimal. The long-term impact on the national and regional energy supply may be positive because M-X will encourage alternative energy technological developments.

Texas/New Mexico

The region is serviced by Region 22 of the Southwest Power Pool. Under summer conditions peak demand is currently to increase from approximately 13,000 Mw in 1980 to 17,000 Mw in 1985 and to 21,000 Mw in 1989. Under winter conditions peak demand is projected to increase from approximately 10,000 Mw in 1980 to 13,000 Mw in 1985 and to 16,000 Mw in 1989. As with the Nevada/Utah region, slight decreases are projected in consumption of petroleum, natural gas, fuel oil, heating oil and gasoline for the 1980 to 1990 period.

Impacts on energy resources would be similar to those for full basing in Nevada/Utah. Fewer transmission lines would be required than in Nevada/Utah due to the existing infrastructure of the area. Some would be required, however.

Regionally the induced effect of the M-X project on the total electrical energy supply is minor, about one percent of the two state planned capability in 1989. This is less than seven percent of the summer excess available power and about three percent of the winter excess available power. No new generation facilities would be required.

Split Basing

Split basing reduces the impact on energy demand in each area is reduced by about half. The allocation adjustment for fuels would be smaller in each region than for full systems. The total energy required for split basing would be somewhat greater due to duplicate facilities, in particular the Designated Assembly Area, and slightly greater total employment.

Mitigations

- o Develop base comprehensive plans which emphasize facility designs minimizing energy and maintenance needs.
- o Develop and utilize, if practical, renewable energy sources. A major DoD and DOE program is underway to develop alternative energy systems which can provide reliable operating power for M-X and could be a stimulant for commercial use. Systems under study include photovoltaics, wind, solar energy, thermal troughs, solar thermal dishes, solar thermal central receivers, and biomass technologies such as alcohol and methane production.
- o Plan for timely adjustments of fuel allocations.
- o Co-generation of electricity at the OB heating plant if feasible.

Land Ownership

Nevada/Utah

Of the land ownership types in the region, federal land is subject to the greatest adjustments. Several proposals exist to convert public lands to private or state ownership or to change the administrative status. These include mining claims, the Desert Land Entry Program, Indian Reservation Land Expansion, Wilderness Areas withdrawals, Nevada and Utah state park proposals, and National Park Service Proposals.

Under the Proposed Action, 1,439 acres of private land would be disturbed by DDA construction, but 544 acres could be returned to private use upon completion of construction. The 895 acres permanently required are equal to only 0.02 percent of the private land in the Nevada/Utah study area. Future non-M-X projects such as IPP, White Pine Power and Nevada Moly will also use some privately owned land. The open pit molybdenum mine in Nye County will use about 2,900 acres of privately owned grazing land. It is the only projected large non-M-X use of privately owned land in the region. Because of the permanent nature of the M-X protective structures, it is unlikely that the ground on which they are located would be retrieved for private agricultural use. Roadway systems, however, could be returned to either the original owner's use, or left open to public use with maintenance by local or state jurisdictions.

The site of Coyote Spring Valley operating base is presently public domain, under the administration of BLM. It is unlikely that it would use private land since the nearest private tracts are about 10 mi north in Lincoln County and about the same distance southeast in Clark County. The site of the operating base near Milford, UT is mostly under BLM administration, but about 360 acres of private land would be affected. More private land could be involved, depending on the actual siting of the base. The Beryl base is largely on private and state land. Even if it were relocated within the suitability zone, it would probably still be on private land. Most of the zone is privately owned, with BLM land found only in the foothills on the north, and in the valley in the extreme east. If the Delta base were carefully located within the suitability zone, it could be placed entirely on public domain. Since state lands occupy four sections out of every township and private land is found near the town of Delta, state or some private land would likely be used, however.

Texas/New Mexico

The vast majority of the land in the Texas/New Mexico region is privately owned. Some BLM-administered land is located in the eastern portions of Chaves County. Less than 6 percent of the total area is state owned, entirely in New Mexico.

Full basing would impact 146,700 acres of private land in 21 counties for construction, with 91,500 permanently required. Though these are locally high impacts, regionally the effects will not be significant. Future non-M-X projects such as the Tolk Power Plants, Highway I-27, and the CO₂ pipelines will not use significant amounts of privately owned land. Because of the permanent nature of the M-X structures, it is unlikely the ground on which they are located would be

retrieved for agriculture. Roadway systems, however, could be left open to the public with maintenance by local or state jurisdictions. Return to private ownership would be in accord with established procedures.

The 8,300 acre operating base site adjoining Cannon AFB west of Clovis, New Mexico, would be located entirely on what is now privately owned land. The base site 10 mi southwest of Dalhart would require about 6,200 acres of private land. This impact is also not considered to be significant. Two sections of land out of every township in the New Mexico area are state lands. There is also a possibility that state lands could be used in lieu of private lands by moving the Dalhart base two miles west.

Split Basing

In Nevada/Utah little private land would be used for M-X and impacts would not be significant except potentially to an individual landowner. In Texas/New Mexico land purchases, 12 of the 18 affected counties would have a high impact and four would have a moderate to moderately high impact. Impacts at the Clovis OB would be the same as for full basing.

Mitigations

- o Avoid privately owned land in Nevada/Utah with minor alterations of system layout, when possible, during Tier 2 decision-making for specific selection of M-X cluster and road sitings. It will not be possible to avoid privately owned land in Texas/New Mexico.

Land Use (Irrigated Cropland)

Nevada/Utah

For a worst case analysis, all irrigated cropland is assumed to be prime farmland. The principal disturbance of cropland by M-X construction would be in Snake, Lake, and Monitor Valleys. Total irrigated farmland used under the worst case would be 180 acres. After construction, about 77 acres could be returned to irrigated agriculture. Although these impacts are low, it is anticipated that they would be further reduced during Tier 2 decisions.

The Coyote Spring Valley and Milford OBs would not directly affect irrigated cropland. However, in the vicinity of both OBs, irrigated cropland could be converted to urban uses. The significance of this indirect impact cannot be predicted. Purchase of water rights may result in 2,000 acres of irrigated acreage being converted to other uses near the Milford OB. Purchasing of water rights could have similar impacts at the Delta OB.

Texas/New Mexico

About 9,000 acres of irrigated cropland could be disturbed by construction while 6,300 would continue to be required during operations. Four of the 22 Texas/New Mexico counties are projected to experience high impacts, 4 would experience moderate impacts and 11 would experience low impacts. Co-use of upgraded section roads would be maximized and spacing has been adjusted to reflect ownership patterns so that the potential for impacts has already been minimized in project planning. No impacts on crop dusting are anticipated in the DDA.

The Clovis OB would require an additional 3,500 acres of irrigated land or about 2.4 percent of the Curry County total. The Dalhart OB suitability zone is chiefly rangeland and would not impact any irrigated cropland.

Split Basing

In Nevada/Utah, 92 acres of irrigated cropland could be disturbed by construction and 57 acres retained for operations. No significant impact is predicted for the DDA nor at the OB. In Texas/New Mexico, 1,780 acres will be disturbed, and in no county is this a significant amount of farmland. Impacts on individual sections where M-X would be deployed would be comparable to full basing but it may be possible to avoid all center pivot irrigation systems during Tier 2 analyses.

Mitigations

- o Avoid, if possible, siting M-X facilities which would interfere with irrigated cropland.
- o Co-use, where feasible, upgraded section roads.

Ranches and Homes

Nevada/Utah

In order to assure resident safety around the shelters, no habitable buildings will be allowed within a 2,965-foot radius circle around each protective structure. The purpose of this zone is to provide safety to residents from potential accidental explosion of missile propellant. In siting the protective structure, every attempt would be made to stay at least 2,965 feet from a home. If this could not be done, it would be necessary to move the home.

In Nevada/Utah, a maximum of ten buildings, six in Nye County and none in Utah, would have to be relocated as the result of the safety zones. Refinements at Tier 2 would probably negate the necessity to relocate any homes in the Nevada/Utah region.

Texas/New Mexico

Approximately 1,400 homes and ranches fall within the safety zones. Potential relocations in Texas exceed those in New Mexico by about two to one, with a major portion of the Texas relocations being in Deaf Smith County (146) and Parmer County (225). About sixty percent of the New Mexico relocations are in Roosevelt County (297). Of the 22 affected counties in the Texas/New Mexico region, the potential for relocation exceeds 50 homes and ranches in all counties. During Tier 2 refinements, it is anticipated that 10 homes could be avoided in each county.

Split Basing

Impacts in Nevada/Utah would be negligible. In Texas/New Mexico, a maximum of 141 residences might have to be relocated. The facility layout for this alternative was specifically designed to minimize the number of homes directly affected. With Tier 2 refinements in the cluster layouts, these figures could be further reduced.

Mitigations

- o Relocate protective structures, where possible, to avoid including homes in the safety zones.
- o If possible, and when the owner is willing, relocate the home outside of the safety zone but still on the same parcel of land.
- o If the home must be destroyed, compensate the owner for its value.

Grazing

Nevada/Utah

Continued overgrazing in certain locations is projected to continue, but BLM allocations of land for grazing are currently undergoing a major review designed to reduce potential overgrazing during the next decade.

The loss of animal unit months (AUMs) in the DDA will be about 7,200 AUMs or 0.72 percent of the total in all affected valleys. Indirect losses are also possible. Over the entire project area, non-M-X projects contribute little to changes in AUM levels. Impacts may be significant for operators utilizing public lands. They have such a narrow profit margin that their ranching could become uneconomic with even a minor AUM loss.

Loss of water locations could also reduce AUMs. M-X roads will open existing fencing, but the government will have to replace the fencing or compensate the rancher for its cost. Some types of sheep operations could cease in valleys where M-X activity is high.

The Coyote Spring OB could displace 106-153 AUMs. This will be a permanent loss affecting approximately 2.5 percent of AUMs in the Delamar and Arrow Canyon BLM allotments, the highest percentage of any OB location.

The Milford OB could displace 248-359 AUMs or about 0.5 percent of the Cook and Antelope Peak allotments. Some private land would also be affected. These losses will be permanent.

The Beryl OB occupies parts of four allotments (Tilly Creek, Bennion Spring, Del Vecchio, and Mule Spring). Losses from direct vegetation disturbance in the four allotments would be about 212 to 370 AUMs.

The Delta OB would be in the Desert allotment. Grazing losses would be 208 AUMs.

At the Ely OB (Steptoe), losses would be a total of 176 AUMs in the Tamberlain, Little White Rock, and West Schell Bench allotments.

The aforementioned losses could be significant to individual operators; however, regionally, these losses are not significant. The significance of losses to local operators and potential mitigating measures will be determined during Tier 2 siting studies.

Texas/New Mexico

A total of about 14,600 animal units, or about 0.65 percent of the total in the impacted counties could be lost from full basing in Texas/New Mexico. Impacts of these losses may be significant for some operators. Impacts would be concentrated in Texas.

The impact of the project on livestock production in Texas and New Mexico will be substantially reduced by avoidance of feedlots during Tier 2 studies and decision making. Projected losses in some Texas counties would be reduced by as

much as 75 percent and in some New Mexico counties by as much as a third. The avoidance of cropland that is primarily used to raise feed for livestock could also significantly reduce grazing losses.

Livestock losses at the Clovis OB as a result of land purchased for the operating base would vary from about 470 to 800 feedlot cattle. The significance of this loss is unknown, but would depend on the owner's ability to transfer his operation.

Losses at the Dalhart OB would be approximately 900 animal units, assuming feedlots could not be relocated in the area.

Split Basing

In Nevada/Utah the split basing layout avoids about half of the valleys shown for full basing. Overall about 3,650 AUMs, or 0.6 percent of the total in the affected valleys, would be lost in the Nevada/Utah area. Fifty-three percent of the loss will be in Nevada and 47 percent in Utah.

Split basing in Texas/New Mexico would avoid all high animal unit concentration counties except Deaf Smith. Compared to full basing in Texas/New Mexico, potential animal unit losses would be reduced by 71 percent in Texas and 35 percent in New Mexico.

Mitigations

- o Avoid highly productive grazing areas
- o Payment of monetary compensation
- o Range improvements (e.g., conversion of project water developments to stock use)
- o Avoid cropland that is used primarily to raise feed for livestock
- o Improved vegetation

Recreation

Nevada/Utah

The impact on the deployment area formal recreation facilities would not be significant because recreation demand will be less than regional facility capacities. The population increase in Clark County from an OB at Coyote Spring Valley, 5 percent peak year and 2.5 percent permanent increase by 1990, is not expected to add significantly to the projected shortages of campsite facilities or water-based recreation facilities in Clark County.

An OB at Milford would result in a 336 percent population increase in the peak year (1989) and a 244 percent increase in 1991 over baseline projections. Although M-X would create a large population increase over baseline projections, the existing recreational facilities in the immediate vicinity are expected to be adequate to meet the projected increase in demand associated with M-X in-migration.

The Ely OB would, with other projects, result in shortages of water-based recreation and tent/trailer and vehicle camping facilities. Most significant impacts would be at three lakes--Comins, Bassett, and Cave Creek. Most impacts to campsites would be in the Humboldt National Forest. Water-based recreation would be significantly impacted over the long term. Campground development may be required to keep up with projected demands.

Texas/New Mexico

Increased recreational demand as a result of M-X in-migration into the Texas/New Mexico region is not expected to be significant over the life of the project. Significant impacts may be experienced at various locations near OB sites, however.

Split Basing

The impacts would be as described for Coyote Spring and Clovis.

Mitigation

- o Improve facilities.

Native Americans (Cultural Resources)

Nevada/Utah

Native Americans in the region are expected to continue the gradual process of growth and economic diversification and efforts for expansion of tribal land and water resources, both of which are necessary for economic survival and future development.

The DDA contains 313 known Native American ancestral/sacred sites, 39 of which are within one mile of construction activity. Most long-term and indirect impacts are expected during operations. M-X roads are expected to improve area access, which will increase the potential for vandalism to rock art, ancestral habitation sites, ceremonial sites or structures, and battlefields. Mitigation-by-avoidance, the preferred mitigation, would be implemented under terms of the Programmatic Memorandum of Agreement which is discussed under Archaeological and Historical Resources.

An impact that cannot be quantified is the symbolic and spiritual effect on Native American religious and cultural life. Any development irreversibly alters the holy lands of Shoshone and Southern Paiute peoples, and the M-X system represents large-scale development.

The Coyote Spring Valley OB Suitability Zone is in a major ancestral Southern Paiute seasonal migration route and is associated with temporary and permanent habitation sites, burial grounds and a wide variety of other sacred features. Impacts to these areas would probably be significant. Site densities are expected to be high throughout the OB Suitability Zone. During construction, significant impacts to ancestral settlements and associated burials would probably occur in foothills, washes and streams, and particularly along the Muddy River.

If permitted, depletion of the water table near the Coyote Spring Valley OB during construction or operations may reduce flow to springs and marshes in which Southern Paiutes gather plants used in rituals. The magnitude of these impacts would probably be significant.

No data on Native American ancestral/sacred sites are available for the Milford OB. The northern Escalante Desert was ancestral territory of Southern Paiutes. Some resources may occur along Beaver River, but much of this area is already disturbed by farming.

The Delta OB Suitability Zone is in a densely settled aboriginal area. Known sites are limited to several lithic scatters and campsites near the OB. Direct construction impacts cannot be predicted because of limited data. Within a two-mile radius of the Sevier and Beaver rivers, site concentrations and significant impacts are expected to be greatest. The larger northern Sevier Desert, Utah area contains a wide variety of significant Native American cultural resources which could be indirectly impacted. Simultaneous development of the Intermountain Power Project area at nearby Lynndyl may increase the demand for recreational development of areas in which sensitive Native American resources are concentrated.

From the Beryl OB, the M-X DTN roadway to Pine Valley could run through a major mountain pass known to have untouched aboriginal settlements. This area has significant secular and sacred resources; disturbance of these resources would be significant.

The portion of the OB suitability zone north of Ely has dense concentrations of Shoshone ancestral sites and is expected to be very sensitive in the view of local Native Americans. Site data for the suitability zone south of Ely are less complete. The lower and upper bajadas of the Egan Range contain springs and traditional foods; recreational use of this area will be significant. Lowlands are expected to be less sensitive, comparatively. Due to the dense Shoshone settlement of Steptoe Valley and adjacent Spring Valley in prehistoric and historic times, indirect impacts to ancestral/sacred sites would be extensive.

Texas/New Mexico

In this region, increased recreational activity will facilitate unauthorized excavation (pot hunting), vandalism, and unintentional disturbance. Projected road improvements would not significantly increase the potential for public access to culturally significant sites. No Native American socioeconomic resources have been identified within the region.

The Texas/New Mexico full basing deployment alternative has the least potential for negative impacts on Native American cultural resources. No direct or indirect impacts to known aboriginal habitation or sacred sites are indicated in the deployment area or at the Clovis and Dalhart OBs.

Split Basing

Impacts would be considerably less in Nevada/Utah than those for full basing. Of 212 known ancestral/sacred sites, 17 would be directly impacted by construction, but many of the remainder may be significantly impacted by indirect causes. Impacts at the Coyote Spring OB would be the same as for full basing. Coyote Spring remains the OB site at which the most significant adverse impacts would occur.

Mitigations

- o A Programmatic Memorandum of Agreement (PMOA) for the preservation of historic properties has been negotiated among the Air Force, the Office of Historic Preservation, and the Bureau of Land Management (see Chapter 5, Appendices, of ...). The PMOA includes the following:
 - Procedures for compliance with federal laws protecting cultural resources
 - Native American ancestral/sacred sites as properties eligible for nomination to the National Register.
- o An inventory will be accomplished of sites and areas known to be of cultural and religious significance to Native Americans.

- o M-X facilities will be sited to avoid known sensitive areas.
- o Native American cultural resource specialists from local reservations will be sought to participate on pre-construction survey teams.
- o Mitigative strategies will be developed in consultation with appropriate local tribal governments via liaisons established during pre-construction on-site surveys.
- o At the request of tribal governments, and in coordination with the BLM and State Historic Preservation Officer, excavated artifacts may be returned to local Indian reservations.
- o In some instances of accidental disturbance of cultural resources, site or feature avoidance may be instituted. If, for example, burial grounds are discovered during construction, the construction activity (e.g., road, borrow pit, shelter etc.) may be moved.
- o Cultural resource monitoring will be implemented to promote cultural resource preservation.

Native Americans (Water and Land Use)

Nevada/Utah

Impacts to Native American water accessibility and land use in the DDA could occur in the Railroad and Little Smoky valleys surrounding the Duckwater Reservation and the grazing lands it uses and proposes to withdraw for Reservation expansion. Impacts could also be felt at the Moapa Reservation, which is dependent on water from Muddy River Springs and the White River drainage system. These impacts would occur only if the State Engineer authorized the Air Force to withdraw water in excess of annual recharge capacity.

In valleys surrounding the Duckwater Reservation, 12,600 acre-ft of construction water would be required. Short-term localized effects on Duckwater Reservation springs and wells could occur. If the construction period occurs in dry years, this impact could be significant. After pumping ceased, recovery of the water table would follow in a few weeks or months. Longer term impacts could occur if the underlying structure of springs and shallow wells were disrupted.

Construction in the White River drainage would have little impact at Muddy River Springs, unless it coincides with a dry period. If reductions occur at Muddy River Springs, it could reduce agricultural uses at the Moapa Reservation (which currently uses 24 percent of the Springs discharge) and potentially restrict agricultural development in a proposed 70,000 acre Reservation expansion.

Coyote Spring Valley OB groundwater use would directly and seriously affect the water flow of the Muddy River and indirectly impact Moapa Reservation agricultural resources. The other OBs would not impact any identified Native American land or water resources.

Texas/New Mexico

There are no identified Native American water resources or agricultural land use in the deployment area or at the operating bases.

Split Basing

The potential for impacts is reduced somewhat, but still generally parallels those described above.

Mitigations

- o Possible impacts on the Duckwater Reservation are avoidable if care is taken to locate M-X construction wells sufficiently distant from Duckwater water sources so as to avoid any impact due to excessive drawdown to the maximum extent possible.
- o At Muddy River Springs, construction pumping could be monitored and modified according to climactic conditions.
- o Mitigation of the water problem at Coyote Spring Valley can best be dealt with by purchases of surplus water from Las Vegas for construction

and operation needs during the life of the base. This would relieve any stress on local groundwater resources, and could produce an increased flow to the Moapa Reservation. However, this solution would be very costly.

- o At Coyote Spring, adopt a strict water regime to minimize use.

Native American Migration

Nevada/Utah

In-migration to Native American communities in search of M-X-related employment could overwhelm the economic and sociocultural resources of some reservations and colonies and cause economic, social, and cultural decline at others. The rate of such in-migration is not predictable.

Reservations that could be impacted are the Duckwater (present population, 124), the Moapa (189), the Ely Colony (187), the Goshute (602), the Cedar City Colony (177), the Kanosh (73), and the Shivwits (65). Given the small populations, even a small number of in-migrant families could double or triple reservation and colony size. Housing, water, schools, and social services, already taxed or inadequate, would be significantly impacted. Federal funding based on tribal membership would not help reservations with large numbers of nonmember residents. Crowding would stress social and cultural relations.

It cannot be calculated whether M-X will help or hinder Indians generally. While adverse impacts can be expected, they may be offset by substantially improved economic conditions, including employment at good wages, or by federal, state, or other assistance programs. Mitigations could be accomplished through development aid to keep peripheral reservations economically attractive during and after construction and to maintain economic vitality at central reservations after construction.

Texas/New Mexico

No reservations are located in or immediately adjacent to the deployment area.

Split Basing

Impacts would be qualitatively the same as those described above, but reservations distant from the smaller DDA are less likely to be impacted.

Mitigations

- o Federal aid to alleviate impacts from increased population.
- o OEA waiver of matching-funds requirements.

Archaeological and Historical Resources

Nevada/Utah

Significant direct and indirect effects are expected to occur to all categories of site types: "multiple activity" (habitation sites); "special purpose" (rock, art, cemeteries, shrines, battlegrounds); "limited activity" (small lithic scatter, refuse dumps, corrals, trails, short-term camps); and "isolated finds," which are isolated artifacts of human manufacture or use.

Nearly 400 sq mi of resources would be within one mile of DDA construction. More than a third of this area contains properties of high value, many expected to be eligible for the National Register.

National Register property boundaries have been avoided in the DDA layout, but indirect impacts may occur where construction is adjacent to the property.

Construction also has the potential to produce significant indirect impacts to National Register and eligible properties because of construction worker recreation use, vandalism, or unintentional damage. Hydrologic subunits with construction camps have the potential for the severest impacts.

Indirect growth-related impacts would also be expected in nearby communities where expansion could change the present architectural character and where new construction might cause destruction of significant historical structures. Potential impacts would occur in Caliente, Panaca, Alamo, Hiko, and Pioche.

All OB locations have high potential for significant impacts.

Texas/New Mexico

Dallam County would have 6 sq mi of high-value resources within one mile of construction, Harding 7.2, Chaves 4.5, Deaf Smith 4.7, and Curry 3.6. The OBs are not included in these figures.

National Register site Anderson Basin Archaeological District in Roosevelt County is near potential gravel quarrying. Indirect impacts could occur from ORV use, looting, vandalism, and more traffic at the National Register site at Landergin Mesa -anhangle Aspect Village in Oldham County. The registered Rocky Dell petroglyph site in the same county could also be significantly impacted.

The Clovis OB would directly impact 10 moderately significant playa lakes. Highly significant direct impacts would occur at the registered Blackwater Draw if quarrying for gravel occurs there, but this is not planned. No predictions of indirect area impacts have been made, but significant impacts are expected in the town of Clovis.

The Dalhart OB is within one mile of two moderately significant playa lakes and highly significant resources in Middle Water. Indirect impacts are expected along Rita Blanca and Punta de Aqua creeks and at the registered Landergin Mesa. Multural resources in Dalhart may also be significantly impacted.

Split Basing

Impacts at the Coyote Spring Valley OB would be the same as for the Proposed Action and at Clovis the same as for full basing. In Nevada/Utah direct impacts on National Register properties would be avoided, although the Topaz, White River, Tybo, Bristol Wells, and Delamar properties could be indirectly impacted as described for the Proposed Action. In Texas/New Mexico, impacts to registered properties would be the same as for full basing.

Mitigations

A Programmatic Memorandum of Agreement has been prepared by the Advisory Council for Historical Preservation and signed by the Air Force and BLM. State historical preservation officers in Nevada/Utah, Texas, and New Mexico have been asked to sign it also. The PMOA establishes a system for planning the protection or recovery of archaeological and historical resources. Plans will be published and public comment invited.

Direct impacts to current National Register properties have been avoided by the cluster layout under consideration.

For indirect impacts, reduced population incursion, restricted access to sensitive areas, protective measures, and increased public education are measures which can serve to reduce these effects.

The principal mitigation measure during the project siting phase will be reduction of impacts through avoidance. Valleys and other areas of particularly high sensitivity will be excluded from the siting area to the extent that overall project design allows. Within valleys that are selected for project siting, maps of archaeological sensitivity will be used to prepare engineering layouts that reduce direct impacts to these resources.

Prior to the initiation of construction a data recovery program will be implemented in accordance with the guidelines outlined in the cultural resources Programmatic Memorandum of Agreement. If buried deposits are encountered avoidance or data recovery measures will be implemented as appropriate, prior to the initiation of construction. A monitoring program will also be implemented so that any archaeological resources discovered during construction can be evaluated efficiently.

Paleontological Resources

Nevada/Utah

Paleontologic resources are protected by law in Utah and are afforded some protection by the Antiquities Act in the rest of the area. Some paleontological resources will likely be encountered at construction sites and possibly at building material points and in quarries. Illegal fossil collection may occur.

The Coyote Spring Valley OB is near the channel of the ancestral White River, where fossils are not known but may exist. The Muddy Creek formation near Moapa contains vertebrate fauna; paleozoic rocks containing fossils outcrop in the mountains to the east and west. Direct impacts are not predicted to be significant at the OB, but indirect impacts, primarily illegal collection, may be significant.

Important vertebrate fossils have been found in the vicinity of the Milford OB. Excavations at the OB could destroy fossils. Unless OB layouts avoid fossil-bearing areas, significant direct impacts could occur. The Beryl and Delta OBs are geologically similar to Milford, and the impact potential is the same.

For the Ely OB, along the edge of Steptoe Valley between Ely and the OB Suitability Zone are Sheep Pass Formation outcrops containing fossils. Paleozoic rocks outcropping in the mountain ranges east and west of the OB also contain fossils. All could be significantly impacted by illegal collecting.

Texas/New Mexico

Pleistocene deposits are scattered throughout the study area. Some deposits, particularly in the Clovis area, are very important to the study of man. Disturbance by construction excavation and by illegal collection would be a significant adverse impact, by will be avoided at known fossil locations.

Split Basing

Direct and indirect impacts will be similar but less extensive for each deployment area.

Mitigations

- o Further identify potential fossil impacts during Tier 2 studies and avoid where possible.
- o Incorporate a system for preservation of fossils found during construction activities.

Construction Resources

Nevada/Utah

The regional market area for cement and steel includes Arizona, California, Colorado, Idaho, Montana, Oregon, Nevada, New Mexico, Utah, Washington, and Wyoming. For cement, steady increases are projected between 1980 and 1989 in the value of construction contracts (71 percent), production (30 percent), consumption (25 percent), and mill value (63 percent). Steel plants in the market area have the production equipment in-house to increase output if demand warrants.

The peak requirement is 435,000 tons of cement in 1986. Requirements decline thereafter, ending in 1989. No long-term impacts are predicted, and short-term impacts on supply will not be significant but may have moderate significance in terms of cement price increases or their contribution to overall inflation.

While M-X cement demand is only 2 percent of current area or projected capacity, it would have an impact on regional prices, peaking at about an additional \$2.26 per ton or 2.6 percent increase over the anticipated price without M-X. Total cement use, including M-X, will increase, but non-M-X cement use may decline slightly due to higher prices. Use of a larger cement supply area and advance stockpiling to level off peak needs could further reduce supply impacts and could redistribute or reduce price increases.

Texas/New Mexico

The regional market area for cement is Arizona, Arkansas, Colorado, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, New Mexico, Texas, and Utah. Steady increases are projected for cement between 1980 and 1989 in the value of construction contracts (77 percent), production (16 percent), consumption (30 percent), and mill value (62 percent). The steel market area includes Arizona, Colorado, Oklahoma, New Mexico, Texas, Utah, and the southern portions of California and Nevada. If demand is sufficient, steel plants in the market area have the potential to increase output.

The impact of M-X-related demand is smaller in relative terms than for full basing in Nevada/Utah, but the large absolute requirements would increase prices 0.5 percent. Peak requirements equal 440,000 tons of cement in 1987. In general, Texas projected cement supply is greater than that available in Nevada/Utah, and impacts would be less in the Texas/New Mexico deployment area.

Other construction resources could face localized shortages but neither significant short- or long-term impacts would occur.

Split Basing

The peak demand years for construction resources occur in 1986 and 1987. For split basing, only about half of the resources needed in each region for full deployment would be required. No impacts are forecast for Texas/New Mexico and about one percent of the regional production capacity would be required for Nevada/Utah. Split basing would mitigate the impacts on cement supply and cement price otherwise forecast for full basing.

Mitigations

- o Conduct project planning using 11-state supply area
- o Consider stockpiling cement prior to the heavy use period.

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